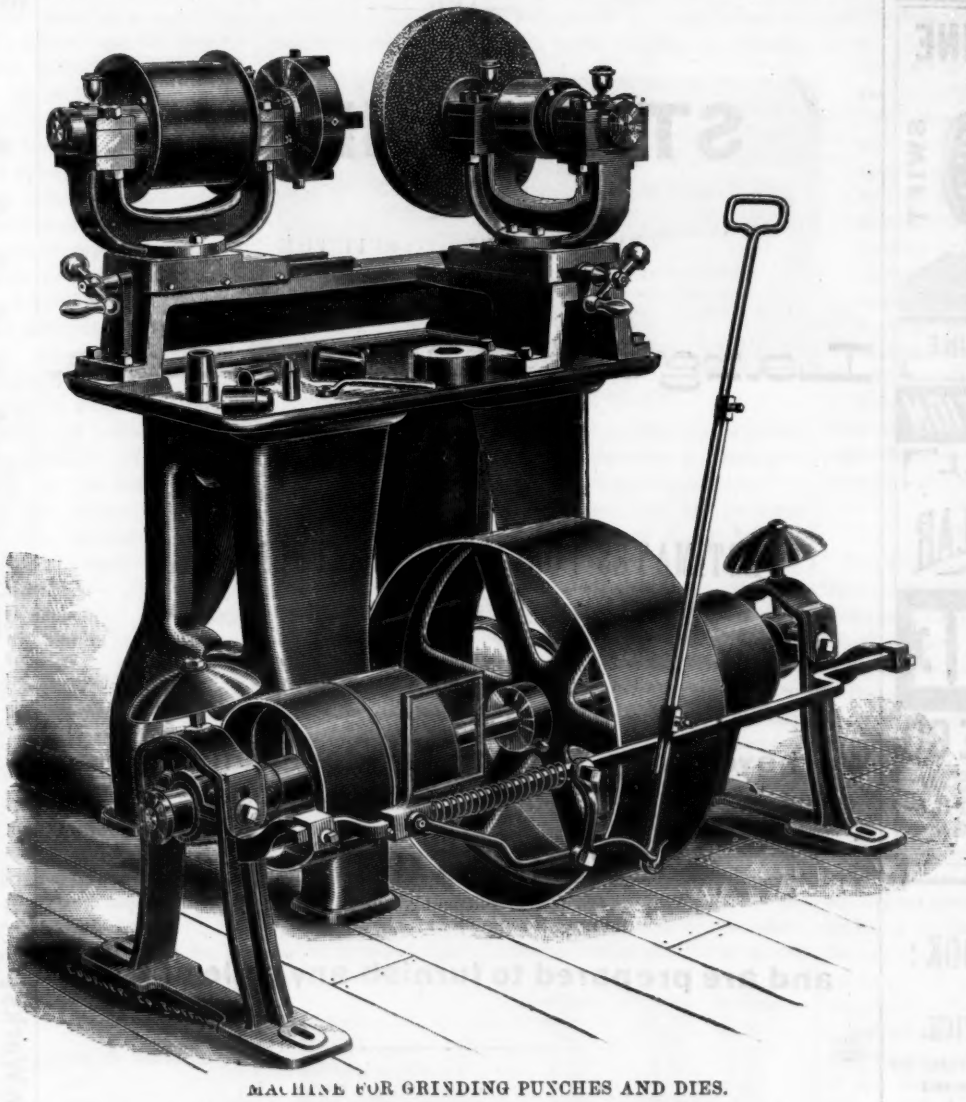
IRON TRADE REVIEW
AND WESTERN MACHINIST

VOLUME XX. CLEVELAND, O., SEPTEMBER 24, 1887. NUMBER 39.

MACHINE FOR GRINDING PUNCHES AND DIES.

The engraving represents a machine for grinding punches and dies, such as are used in making bolts, rivets, screws, and a large variety of square or circular pieces requiring one or more finished faces. It works equally well on hard steel, chilled iron or softer metals. One of the heads carries a universal chuck for holding and revolving the pieces to the ground, and the other an emery wheel. Both of the heads run on a dove-tailed track and are fed in and out by a screw, making it so that convex, concave or flat faces can be well and quickly ground. A stop can be arranged so that the work can be ground to any desired thickness, or several pieces ground to the same thickness. It is manufactured by the Springfield Glue and Emery Wheel Co., Springfield, Mass.



MACHINE FOR GRINDING PUNCHES AND DIES.

ENGLAND AND AMERICA.

Colliery Guardian, London.

The executive of the American Exhibition having granted the use of the Trophy Room for a series of lectures on economic subjects, promoted under the auspices of the London Working Men's Association and the Balloon Society of Great Britain, the first of the series was delivered on Saturday evening by Mr. J. S. Jeans, on "England and America: Some Influences of Modern Discoveries and Inventions." Lord Ronald Gower occupied the chair, and among those present were Mr. George Potter, as president of the Working Men's Association, and Mr. W. H. Le Fevre, as president of the Balloon Society, or Popular Scientific Association, as it is otherwise called. In opening the proceedings, Mr. Potter stated that the object with which this course of lectures has been instituted was that of cementing the good feeling which happily existed between the people of England and the people of America. A few remarks were made by the chairman in introducing the lecturer. He said Mr. Jeans was peculiarly qualified to deal with the subject he had undertaken to treat on that occasion. He has been for ten years secretary of the Iron and Steel Institute, and had written four very able works, the only fault his lordship had to find with which was that they were not published in cheap edition. He trusted the time was not far distant when he might be able to purchase at two shillings a copy of *Supremacy of England*, *Steel*, *Notes of Northern Industries*, and *Railway Problems*.

Mr. Jeans commenced his lecture by stating that the United States had the largest area and population of any modern country except Russia, but it left that country far behind in every respect except those of size and numbers. America had become the granary of the world, and England had become the world's workshop. America owed her prosperity largely to the absorption of millions of England's redundant population. America attributed her prosperity largely to the influence of protection, whilst our political economists gave the credit of our progress to free trade. Half a century ago Great Britain had a population of 9½ millions, and the United States numbered 5¼ millions, and now Great Britain had a population of about 37 millions, and the United States had over 60 millions. Then Great Britain produced practically all the food that her inhabitants consumed, and had something to spare for export, and now she imported nearly six millions of tons annually. Mr. Jeans then enlarged upon the remarkable extent to which mechanical inventions had in a hundred ways come to the assistance of modern industry. He placed the inventions in the order of their relative importance—first, the means of communication; second, labor-saving appliances; third, general scientific culture. A very limited use could be made of the inventions but for the means of transport. The railway system of the United States now exceeded 130,000 miles, being nearly seven times the extent of that of England. The low cost of transport in America had enabled American farmers and ranche owners to deluge England with commodities that our own farmers would otherwise probably produce at a good profit.

Cheap American transport had, therefore, ruined English agriculture, it had assisted the owners of American oil wells to almost annihilate the great paraffin oil industry of Scotland, it had enabled the iron manufacturers of the Eastern States to exclude English iron and steel from the West and South, and the American smelters could bring the raw materials from distances exceeding 1,000 miles. The American resources were infinitely in excess of those of the mother country, and unless the working population of this country were to atone for our deficiencies in this respect by greater industry and a more extended use of mechanical appliances, so as to economise labor and produce cheaply, we should not be likely to hold our position in the race. During the last sixteen years we had paid to the United States £1,248,000,000 for imported commodities. The average price of wheat for the last four years had been a very little over 30s., and we were buying our corn for 20s. less a quarter than we could have done a few years ago, which meant that on our total imports we were saving $20,000,000 as compared with the price paid quite recently. There was not much danger of American competition in manufactured goods for a long time to come. Fully 80 per cent. of the exports from America took the form of raw materials. If American protection were continued at the present range we need not have much fear as regards manufacturers; but if the tariff were abolished the industrial prospects of England would become very much blacker in consequence of the enormous resources that America possessed for cheap production. The lecturer concluded by referring to the extent to which national prosperity and industrial prospects were affected by military and naval expenditure. He mentioned as a striking fact that was at variance with the general opinion of economists and politicians, that the United States had actually since 1861 expended 921 millions sterling on their army and navy, as against 626 millions sterling in this country: But at the present time the annual expenditure on this account in Great Britain was £35,000,000 to $40,000,000 a year, as against about £13,000,000 in America, so that our *per capita* expenditure was about 20s., as against 4s. 2d. in the United States. Our American friends had, however, the further advantage of having only a comparatively small handful of men withdrawn from industrial and productive occupations for military purposes; whereas we had over 200,000 of the flower of our manhood that were not only producing nothing, but hanging like a dead weight around the neck of the productive community.

After the lecture, which had been listened to most attentively and was concluded amid applause, there was a discussion.

DURING the coming winter labor, both skilled and common, will be more generally employed than it was last winter on account of the large amount of railroad construction to be completed in the South and Southwest, and bridge construction in the West and Northwest. Much of the Italian labor that returns to Italy for the winter will be retained for winter work. With the exception of three or four crafts labor is more fully employed this season, and from all appearances the demand will increase.—[Philadelphia Record.

THE Sheffield steelmakers have just secured $200,000 worth of contracts from the British Government for steel plates, and expect more, although the Woolwich yards are being greatly extended for steelmaking purposes.

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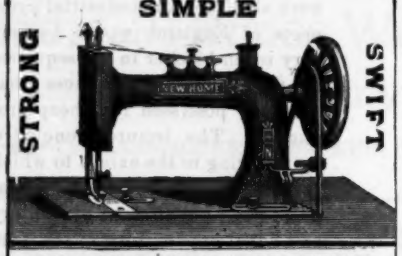

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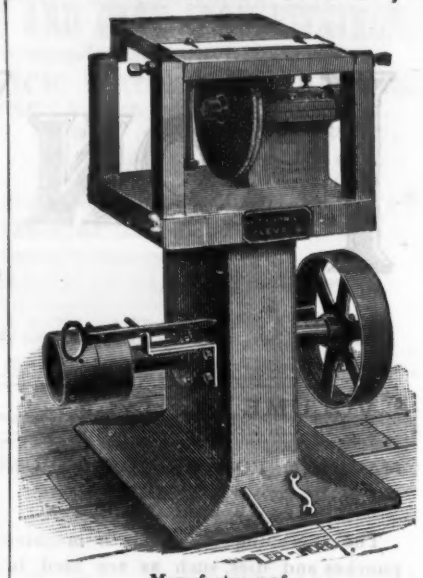

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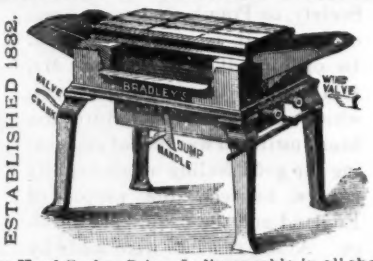

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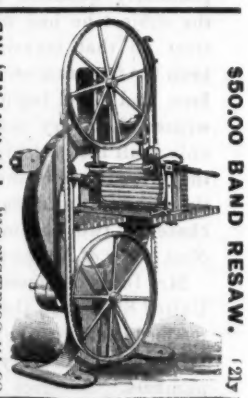

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DUPLEX DIE STOCK.

The accompanying cut represents the Duplex die stock, for threading bolts, manufactured by the Hart Manufacturing Company, Cleveland, Ohio. The points of superiority of these die stocks are: First, perfect threads at one cut; second, quickness, for the operator must never turn back, but simply open and lift off; thus avoiding the danger of crossing or injuring the thread. The dies are then instantly adjusted for the next cut; third, dies can be sharpened on a grindstone like a chisel or other edge tool, and hence can be always kept sharp, which insures a good thread and easy cutting; fourth, these dies can be instantly adjusted for wear, and will cut either over or under size as may be desired. No wrench or screw-driver is used. When we consider the price of this tool as compared with others, and the points of excellence guaranteed by the makers they should commend themselves to machinists and blacksmiths who want to turn out accurate work in the shortest possible time. Prices and description will be cheerfully furnished by the jobbers throughout the country, or by the manufacturers.

CARE AND USE OF THE INDICATOR.

In taking the instrument apart for cleaning, says an exchange, the pieces should be laid down in full view on a sheet of paper to avoid getting grit on them. The sooner an instrument is thoroughly dried, wiped clean and bright, and then well oiled, after using, the better order it will be in, and the better work it will do. It is a good practice to keep the cocks free from grit or dirt by caps screwed on them, or by plugs of cotton waste. The instrument should never be let get cold before wiping it dry and clean. Otherwise it will be more difficult to clean and liable to be rusted or gummed up. The instrument may be easily picked and handled by the paper barrel and inner drum, when its cylinder is too hot to touch. Sponge is better than waste for cleaning the instrument, as the fibres of the latter not only get tangled up in the lever motion, which is a nuisance, but small fibres are apt to get in the pivots and interfere with their lubrication and free action. Fine paste may be used in moderation on a soft rag, on brass and nickel plated portions of the indicator. While agreeing with the makers of indicators as to the desirability of using only the very first watch oil for the pivots and portions not in direct communication with the steam, we can hardly see the advantage in using such expensive material and troublesome methods of lubrication when we consider the cheap common grades of lubricators that work through from the engine cylinder. But as to the pivots and other portions that do not get thus contaminated, "plenty and often" is a good motto for the application of high grade oil. The indicator cylinder might be thoroughly oiled through by a squirt can loaded with olive or good high grade spindle oil. Side motion in the reducing levers should be avoided. Few things produce a more unfavorable impression as to the accuracy of a test than a shaky, wobbling clattering rig. Of course any lost motion is undesirable.

Burglars as Mechanics.

Burglary is not usually classed among mechanical trades, but it is nevertheless an "industry" in its peculiar way, and very numerously followed in cities and large towns. Some one—a safe manufacturer, we believe—has been at the pains of compiling a summary of the processes which burgulars employ in the present advanced state of the art. They are said to be:

First.—The driving of wedges into door-jambs, by which the tenon is forced out of the packed groove, and explosives asserted around and into the rabbet or stepped flange.

Second.—The application of the drill on material represented as drill-proof metal.(?)

Third.—The application of the Harris stripper, in peeling plates from their rivet and machine screws fastenings.

Fourth.—The application of the Burton pulling wrench, by which lock and bolt spindles are drawn out of doors.

Fifth.—The application of the Mason ripper, a late and ingenious implement of burglary, used on safes or vaults with iron surfaces.

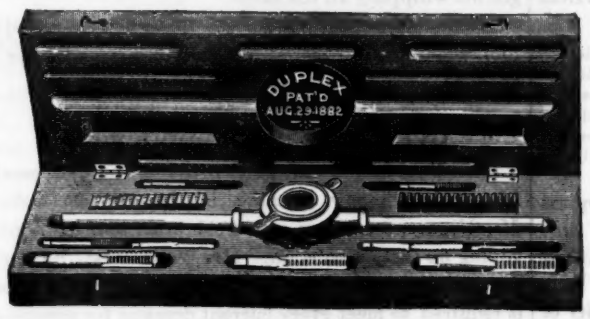
Sixth.—The application of the powder pump in forcing explosives around the jambs of safe doors and into crevices created by wedging and in the use of jackscrews.

Seventh.—The explosion of dynamite on the surface of the door by which the bolts and bolt frame are dislodged by concussion.—[Mechanical News.

IRON MAKING ON THE LAKES.

Iron Age.

For some time past Buffalo has been agitated by the question whether or not there is room in that locality for enterprise in the direction of establishing blast furnaces and a steel industry. One of the newspapers warned against such an undertaking on the ground that past experience has been disastrous, while it is vehemently asserted on the other hand that no fair inference can be drawn as to the future from the past, and that all that is needed is to utilize exceptional local advantages by a display of moderate enterprise. It is asserted, with some show of plausibility, that Buffalo, with its heavy coal shipments West, can command favorable rates on ore from Lake Superior districts, and that it is favorably located so far as accessibility to fuel supplies is concerned. Another element has been injected into the discussion by the letters written by Mr. T. D. Ledyard, of Toronto, who has put in a plea on behalf of Canadian ore. Thus far the investments of American steel works in Canadian magnetite deposits have been far from encouraging, and it may well be questioned whether, as Mr. Ledyard asserts, the ore can be put on cars at mine at $1 per ton. At one of the largest of our magnetite deposits, having facilities far beyond any which could be claimed by any known Canadian vein, the cost is fully $1.25. Under the circumstances the question may well be raised whether $1.50 could be beaten as the cost of Canadian magnetite. Mr. Ledyard, in his estimate quoted in our issue of September 1st, makes no allowances for dock and transfer charges at Buffalo, so that the cost of Canadian Bessemer magnetite, without leaving any profit to the Canadian mine, would be $4.50. Mr. Ledyard has quoted figures presented in a paper by Mr. Birkinbine when dealing with the question of iron making at Duluth, which were based on conditions as they exist this year. Taking those relating to Chicago



DUPLEX DIE STOCK.

and Cleveland he has contrasted them with his own computations for Buffalo. It may be observed that this puts in Lake Superior ores at rates leaving a round profit to the miners of that region. The year 1887 has been one of high prices for ores and for coke, and of high freights on ore. In reality, the large works have not paid them. They are running now on contracts for Connellsville coke at not more than $1.50, and the producers of that fuel would be enjoying an exceptionally good thing indeed if they could get that price for a series of years. Vermilion ore would leave a good profit at $4 on vessel at Two Harbors, while Gogebic ores, without any hardship to the producers on the range, could sell in years of fairly active consumption at $3.50. Coke freights in Chicago are $3.30, to Cleveland $2.35 and to Buffalo about $2.50, all for Connellsville. The ore freights generally have been exceptionally high this year. As an average under ordinary conditions, $1.50 from Two Harbors, and $1.40 from Ashland would be fair. Thus revised, we would have the following figures as representing the nominal cost of ore and fuel at the three points named below:

	Cleveland.	Chicago.	Buffalo.
1 ton ore	$4.00	$4.00 }	$4.25
Freight	1.50	1.30 }	
Dock charges	0.30	0.30	0 30
0.52 ton Gogebic ore	1.82	1.82	1.82
Freight	0 73	0.60	0 80
Dock charges	0.15	0.15	0.15
1 ton Connellsville coke at furnace	3 85	4.80	4.00
Total	$12.35	$12.87	$11 32

On the face of it, therefore, Buffalo would have some encouragement, assuming that Canadian magnetite could be laid down at that port at $4.25, of which we have, to say the least, grave doubts, not to raise the question of quality. But it must not be forgotten that in carrying so heavy a percentage of magnetite, a furnace could not smelt with as small a quantity of coke as stacks at Chicago, probably not within 10 per cent. of it. This would go far toward wiping out the apparent margin in favor of that point. On the other hand, it is true, that a furnace at Buffalo might use in its burden Walston coke as the principal fuel, but under those circumstances, with magnetite in charge, could probably not produce much more than two-thirds of the output of a stack running on mixture like that of the Chicago or Cleveland steel works. This would mean higher cost for labor, incidentals, superintendence, repairs and interest. Taking all these points into consideration, we question whether any tangible advantage would remain, even conceding the low price of Canadian ore as possible. Equally important with the question of cost of manufacture is that of markets. Any one going into the iron business to stay will dismiss promptly such arguments as that advanced that there is a great demand at one particular point, because this year a number of local consumers have been unable to place orders. The rush in the demand in 1887 has been phenomenal all over the country. It may or may not continue in 1888, but we question whether there are many in the iron trade who expect it to go right along in the same manner for any protracted period. We would have to build at least 10,000 miles of railroad every year, a point which we are far from as yet. It may be argued that it does not make any difference what the demand and the supply of the country at large may be. If one point has facilities to produce cheaply and cover a given market better than existing works, it will secure and hold that market and simply shut up its competitors or force them to seek an outlet elsewhere. So far as steel manufacture at Buffalo is concerned, we doubt whether it possesses sufficient advantages over Western and Eastern Pennsylvania or points on the Hudson River Valley to give it the position claimed, so far as its home market is considered. In the West and Northwest it must meet the powerful rivalry of Ohio and Illinois. In foundry irons it is the battle ground of the furnaces of the Mahoning and Shenango Valleys and the Lehigh and Hudson River companies, all of them possessing certain advantages, and all to some extent being pushed or likely to be pushed into that direction by the invasion of Southern pig into their own markets.

These are some of the considerations which put a somewhat different face on the quotation at issue. We may be mistaken in some of the points raised, but we believe that we have accomplished our purpose in showing that one-sided statements may be very misleading to say the least. To determine whether or not an iron industry of any magnitude could thrive at Buffalo calls for a much profounder study than appears to have yet been made. In any case, its outcome would be found to be that the margins are not, by any means, as liberal as might be believed from the statements published thus far. It would certainly be rash to go in on the strength of them. It might be wise to embark in the enterprise after a more thorough and conscientious survey of the ground.

The Piedmont Exposition.

The Piedmont Exposition, to open at Atlanta, Ga., October 10, will, aside from its numerous spectacular attractions (including a visit from President Cleveland) afford the best opportunity ever given to study the riches and resources of the South and its people. The cities of Birmingham, Gadsden, Anniston, Rome, Tuscaloosa, Tallapoosa and Sheffield will each make collective exhibits. So will the Richmond and Danville, the East Tennessee, the Marietta and North Georgia, and Georgia Pacific, and the South Florida Railroads. Each of these exhibits will cost several thousand dollars and will be a complete epitome of the minerals, woods, agricultural and industrial resources of the cities and sections covered. More than thirty counties will make collective exhibits of the entire range of their products, competing for two thousand dollars in prizes for the best collective exhibit.

After the "War Series" and the Life of Lincoln, the most important enterprise ever undertaken by *The Century* is the forthcoming series of illustrated papers upon Siberia and the Exile System, by George Kennan, author of "Tent Life in Siberia," who has recently returned from an arduous journey of fifteen thousand miles through European and Asiatic Russia. The forthcoming series of papers will embody the results of what is believed to be the first successful attempt by a competent investigator to make a careful and thorough study of the Russian exile system on the ground. The series will begin in November with the first of several articles upon the Russian revolutionary movement, entitled respectively: "Prison Life of the Russian Revolutionists"; "The Last Appeal of the Russian Liberals"; "The Assassination of Alexander II."; and "The Fate of the Russian Constitution."

IRON TRADE REVIEW
WESTERN MACHINIST

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CLEVELAND, O., SEPTEMBER 24, 1887.

"COMPLETELY OVERWHELMED."

We are somewhat amused by the subjoined squib from the Chattanooga *Tradesman:*

The *Tradesman* has read with great interest a very able discussion between the *Progressive Age*, of Philadelphia, and the IRON TRADE REVIEW, on the merits of oil fuel. In the issue of September of the *Progressive Age* appears a thorough and elaborate treatment of the subject, which is handled with vigor and ability, and to the unprejudiced reader completely overwhelms its contemporary.

Oh, yes, we are completely overwhelmed—with reports such as these:

Petroleum is now used to generate steam in boilers used to run steam thrashing machines. The danger from sparks in the use of wood and coal in the vicinity of great quantities of combustable matter is very great. The petroleum fires give forth no sparks, and will, therefore, much reduce the risk of burning at thrashing time. —[Journal of Commerce.

Oil fuel has increased our production 20 per cent., and at a considerably less cost than coal.—[B. C. Faurot, Lima Paper Mills.

I use less than two barrels of oil to do the work for which a ton of coal was required.—[Sidney McCloud, Calumet Iron & Steel Works.

Although situated in the coal region, we have entirely abandoned the use of coal for burning our brick. Have used oil four years and would'nt think of abandoning it for coal.—[Lehigh Fire Brick Co.

In using oil, we get steam enough from one boiler now while when burning coal we had to use two. We don't need a fireman, have no coal to heave and no ashes to cart away.—[Peter Schneider, Cincinnati Brewing Co.

We regard the use of crude oil as fuel for electric light stations a complete success.—[W. A. Scott, Champion Electric Light Co.

We have fitted all our furnaces to burn oil as we find that it gives us much better results, and a large saving in expense.—[The National Carbon Co., Cleveland.

We are so well pleased all around with oil fuel that we could not be induced to discontinue its use.—[A. Hess, Cincinnati Spring Works.

We have put in tanks, pumps, pipes, etc., in a permanent manner. Oil, we are convinced, is the fuel of our business for the future.—[Alexander De Lano, Detroit Steel & Spring Works.

In the making of brick the use of oil as fuel means a saving in the cost of fuel of 15 per cent., in the cost of labor of 40 per cent., and a considerable increase in the value of the product. We will back this statement with our reputation in the South, and right in Chattanooga. —[P. L. Sword & Son, Cleveland.

We are having the most satisfactory results from the use of oil in every respect and shall certainly make a saving of from 25 to 30 per cent., at a low estimate.—[E. Bement & Son, Agricultural Works, Lansing, Mich.

As we go to press we receive this substantial testimony in aid of our position:

"We have been using fuel oil in our mill since June. Starting under one boiler, but now firing under three; and also in four of our sheet mill furnaces. We now have finished, and in use, a five-hundred barrel storage tank, and are piping our works for a more extended introduction of the oil.

We find there is quite a saving in use of oil over coal, under the boilers; while in the furnace the percentage is much greater, showing conclusively, not only the economy of oil over coal for our use; but producing a much better product of both iron and steel sheet. Yours truly,

BRITTON IRON & STEEL CO.,
J. W. BRITTON, Prest.

And there is just one other thing we are overwhelmed with, and that is the unspeakable gall of the Chattanooga *Tradesman* in presuming to speak upon a subject with which its fresh and childlike intellect has not been trained to grapple. We have no fault to find with the *Progressive Age* which is talking for bread and butter, if in the face of facts, and, were we at all anxious to boom oil simply because of any business advantage incident to such a course, we might answer by quoting from *Light, Heat and Power* that "the IRON TRADE REVIEW is much more than holding its own upon the question of petroleum fuel." We are satisfied to voice the sentiments of the manufacturers who use oil and like it. There is no object in this continual howl directed against a fuel that is already a success and will remain a success as long as it may be obtained cheaper than coal. The *Progressive Age* is a good deal in the position of the boy who was being lectured by his mother. A man happened along and by way of impressing him the mother said: "I do wish this gentleman would spank you."

The man appreciated the situation and forthwith proceeded to belabor the boy who, shrieking with rage and pain, bellowed: "You dassent, you dassent!" But he got his whipping all the same.

We have to repeat that oil is being extensively used as fuel, whether the *Progressive Age* likes it, or whether it doesn't.

OVERCROWDING PRODUCTION.

Hon. David A. Wells' series of papers on "Economic Disturbances" now running in the *Popular Science Monthly*, are attracting universal attention, while provoking no little discussion. Mr. Wells says: "If production exceeds, by even a very small percentage, what is required to meet every current demand for consumption, the price which the surplus will command in the open market will govern and control the price of the whole; and if it cannot be used at all, or with difficulty, an intense competition on the part of the owners of accumulated stocks to sell will be engendered, with a great reduction or annihilation of all profit."

Who will gainsay Mr. Wells when he declares that "the announcement of any signal success in any department of production or mercantile venture, at once fires the imagination of the enterprising and reckless in every country, and quickly incites to operations which, without such a leaven of stimulus, would probably never be undertaken."

LOCAL INDUSTRIAL ITEMS.

We wish we could impress upon local papers the importance not only of recording all new industrial enterprises but also of giving definite information in regard thereto. This would not only make the item more valuable to the parties immediately concerned, but it would add a hundred fold to its interest in the eyes of outsiders. For instance, what can be made of the following, clipped from an exchange the past week:

Parties from a distance are negotiating for a lot, preparatory to the building of a large roller process mill here.

A very little diligence on the part of the reporter might have elicited the following facts of real value:

Mr. George H. Smith, of Smithtown, O., representing a $50,000 syndicate, is negotiating for a lot preparatory to building a roller process mill in Millville. The mill will be 50x75 in dimensions, five stories high, and will be run by an 8x12 engine. The machinery and motive power have not yet been purchased.

Here is a definite statement on behalf of the new company (even if not yet organized); it gives the name and address of the principal projector; it furnishes a fair idea of the extent of the proposed enterprise, and it affords data on which the boiler-maker, the brick-maker, the contractor, the engine manufacturer, the steam-fitter, the mill machine furnisher, the safe manufacturer, etc., can base an immediate letter of inquiry and ought to result in favorable business arrangements all around. Copied into a trade paper, it immediately reaches the very parties who furnish such appliances and is better than a six months "ad." inviting proposals. Wide-awake concerns do not need to be invited to make proposals with a fairly definite item promptly before them.

And this leads us to a final point. Because the editor, or a few friends, or a whole town knows about a new enterprise is no reason why reference to it should be withheld, or the project ignored, until the plant is completed and the concern is ready to begin operations. The valuable feature of the news should be, and is, the announcement, at the earliest moment consistent with the interests of the new company, of its intention to go ahead. This done, inquiries will not be out of date, coming in long after the contracts have been let. The local papers are doing a good work for the social, moral, and educational work of their communities; now let them pay a little more intelligent attention to their industrial interests.

THE ETHICS OF RECOMMENDATIONS.

An Ohio manufacturer writes us as follows:

What are the ethics of giving recommendations? I formerly had in my employ a young man of excellent business qualifications—a superior penman, an accurate accountant and a close collector. Unfortunately he had one habit which he concealed for some time but finally disclosed by going on a prolonged debauch. Surprised and grieved, I sought him out, obtained his promise to quit the habit, at the same time restoring him to his position. He did well for a short time and then fell again. Again he was given a chance, and once more he betrayed my confidence. Finally his friends came to me and frankly said that his habit was so fixed by years of yielding to it, that they could not consistently ask for his retention. Without waiting to hear my decision, he suddenly left for a distant city, and from there he now writes for a recommendation. What shall I do? To refuse his request when this may be the turning point in his life looks uncharitable. To speak of his good qualities without mentioning his failings does not look honorable. Give us a little chapter on recommendations and the right and wrong of this case in particular.

We must decline to decide particular cases, such as the one above cited, for the reason that we cannot know all the ins and outs of the same. As to these, our inquirer ought to be the best able to decide, especially since he evidently desires to act conscientiously in the premises. In general terms, however, it may be said that a man's signature to a petition or a recommendation ought to be guarded as closely as his signature to a note or a check. It is, in fact, his pledge of good faith. To subscribe to a falsehood or a half-truth (which is the same thing) is not consistent with the best ideals of business honor. To say that a former employe is a good accountant, etc., and to withhold the fact that he is incapacitated for work by reason of his habits is not acting in good faith toward the parties inquiring. Of course the whole aspect of the case is changed when there is a frank acknowledgment of the habit by the applicant and a full understanding of the disadvantages under which he begins his new work. With this fairly understood at the start, there would be no objection to naming his good points. But the motives which would then prompt his recommendation and his engagement would be those of philanthropy rather that of strict business, and it is always well to let the two go hand in hand.

WE commend to our Buffalo friends the query which closes an excellent article from the Chicago *Industrial World*, namely: "Would not Canadian labor employed in the Ontario iron ore mines compete with American labor in American iron mines if Buffalo steel manufacturers should buy their ore on the other side of the border?" Most certainly they would, and yet, as we read Mr. Ledyard's articles, they are even seriously considered the desirability of agitating commercial union with Canada, to the end that the last barrier which protects American miners should be taken down and Canadian ore and admitted free of duty. The local selfishness of such a proposition is in decided contrast with the remark of a large manufacturer of mower and reaper knives and sickles, that his company "could buy English steel for less than it could be bought in this country, but on the broad principle of protection to home industries they preferred to pay a little more so as to give the benefit to American producers and laborers." Exceptions to this rule of unselfishness are occasionally found, but the practice is almost universal among American manufacturers.

ZINC PROTECTION AGAINST BOILER CORROSION.

At a late session of the Northeastern Coast Institution of Engineers and Ship Builders, at Newcastle, Mr. John A. Rowe presented some very interesting data upon the preservation of marine boilers. What he said of incrustation is applicable to boilers in general, and is, in reality, in close connection with the matter which had previously been published by M. Quehant. The corrosions cited belong almost exclusively to the domain of marine boilers, but as they also use the zinc method as a preservative, it will not be out of place to mention them in a few words.

We know that very frequently the interior portions of boilers and steam cylinders, as well as the pistons and rods, are subjected to acids which are set at liberty by the decomposition of animal and vegetable oils. As a matter of fact we possess excellent mineral oils, and their usage has become very general for the lubrication of all interior surfaces; there is no complaint of corrosive action due to their use. In marine boilers, nevertheless, the corrosion still continues to occur, and the principal cause is recognized to be galvanic action. When two plates, one of which is electro-positive, are brought in connection with each other by metallic contact, and are submerged in a corrosive or excitant liquid, such as acidulated or salt water, the galvanic action immediately appears, the water is decomposed, and the oxygen is liberated from the positive pole, while the hydrogen is set free from that of the negative; the plate then which is the most susceptible to corrosion is attacked, and the other plate which is connected with it is preserved in an equal proportion. It is this fact which produces the electric pile of copper and zinc, in which it is frequently necessary to renew the zinc while the copper remains comparatively untouched.

Steam boilers are made of plates of iron and steel, and it must borne in mind that the purest qualities of these metals are electro-positive in relation to those which contain the largest proportion of phosphorus or carbon. Furthermore, if in the same plate of steel we punch a hole in one of the corners, another in the opposite corner, and a third in the middle of the plate, and if the three buttons thereby obtained are tested with a galvanometer, they will probably show different magnetic qualities. For example, one from the corners may be negative relatively to the one in the center. Then, since in one and the same boiler we find plates riveted together which have different galvanic properties and are consequently differently susceptible to corrosion, it is evident that sea water will engender an electric current and that the electro-positive plate will be corroded.

In order to overcome this corrosion which is brought on by galvanic action, we introduce into the boiler, plates of a metal which is more electro-positive than either the iron or steel; in other words, plates of zinc upon which the oxidizing action expends itself exclusively. For a number of years the English Admiralty service have protected the boilers of their war vessels in this manner.

The plates are suspended in the interior and submerged in the water, and then, when their metallic contact is assured, it protects the plates from corrosion. The boilers of the Iris after seven years, and those of the Champion after six years, showed no signs of corrosion, while those of the Carysfort after six years were corroded about ⅛ in. on the body of the sheets and about ¼ in. in the plates of the flues.

These facts are evident proof of the efficacy of the action of zinc. This efficacy consists not only in protecting marine boilers against corrosion, but against incrustations which occur in all boilers of ordinary types. * * * * * * *

Since the introduction of the zinc, and after 18 months of regular work, boiler compounds have not been employed at all. The boiler is inspected every month, with the fires out of course, and is found to contain only a friable deposit which can be taken out by hand.

There are two precautions to take in the employment of zinc in boilers. First, it is necessary to be sure that there is good metallic contact between the zinc and boiler flues. It is an essential condition to the production of a regular electric current.

It is better to solder a mass of zinc upon a rod of galvanized iron, or what would be better still, to put the zinc upon a copper rod. The lump is then hammered out into the form of a plate, but the zinc, being really the electrode, will be proportionately more efficacious as presenting a larger surface. The supporting rod is attached to the boiler, and, passing through the plate, is bolted to it under a convenient bracket on the outside. The plate of zinc, of course, must be placed that it is always under water.

On the outside of the boiler we solder the rod which supports the plate directly to the outside of the boiler, or else solder it to a wire which has a bright metallic contact at all times. We have thus succeeded in obtaining a metallic contact which will at all times be free from interior oxidations. * * * * *

Regarding the dimensions of the zinc plates which have given the best results, we would say that from 35 to 70 sq. in. of surface per ton of water contained in the boiler will be about right for a run of thirty hours. The plates should have a thicknes of 3 in.

In order to preserve the zinc and prevent its polarization, the idea of amalgamating it has also been suggested. It is sufficient to bathe the zinc with a little diluted sulphuric acid and then rub the mercury on with a brush. The mercury has no injurious effect on the iron or steel.

There is also a means of rendering the coating of oxide which is formed upon the zinc porous and friable, and in this way permitting the metal to continue its action, that is, to continue its corrosion. This is done by means of introducing into the boiler a little carbonate of soda. In selenitic waters a double decomposition is produced between the sulphate of lime and carbonate of soda. It forms an insoluble carbonate of lime and the sulphate of soda, which is quite soluble.

A test upon a large scale has been made in an establishment on the Tyne. For two months, two boilers identically the same have been treated, one with a solution of soda and zinc, the other with a solution of sea salt and zinc. The oxide formed around the zinc, in the first case, was very easily removed by hand and could be powdered between the fingers. At the same time the deposit upon the sheets of the boiler was in the form of a friable powder. In the second boiler, the oxide was harder and could only be taken off with greater difficulty. From all appearances the deposit was as friable as that in the first boiler. The test has been continued since 1885, and the results will be interesting.

Zinc rolled up in a spiral form is said to be more efficacious than common zinc.

Fighting for an Invention.

Benjamin Atha and John Illingsworth, of the Newark Steel Company are engaged in a litigation that is of interest to steel manufacturers throughout the country. It is a contest as to which shall have the patent for an improved method for molding steel ingots. It consists of keeping a continuous flow of the metal into the molds, a machine for drawing the metal out of the molds and clipping the ingots being a prominent feature. Mr. Atha claims that he originated the idea and told his partner of it, and that the latter then attempted to obtain a patent on it. Mr. Atha, hearing of this, filed a claim to the invention, when the Patent Office declared an "interference" and ordered testimony taken, which is now being done. Mr. Illingsworth, on the other hand, claims that he worked on the machine weeks before Mr. Atha spoke of it, and that he (Atha) could not invent the machine, as he knew nothing of that department. It is probable that the suit will cause a dissolution of the firm.—[N. Y. Times.

Better Iron and Steel Wanted.

There is a demand for a material adapted to the conditions of car wheel service that shall give much greater wear than the chilled wheel, and not be as expensive as the paper wheel. There are similar demands relative to rails, axles and indeed to all parts of railroad equipment in which iron or steel is used. In not one of these parts is there the strength of material that the change in railway practice, and especially the increased weight of cars, demands. Better material is the want of the hour. The steel and iron of ten years ago answered perhaps for that hour, but conditions have so changed that they will not answer the requirements of to-day. Our works are making rapid progress in this direction, but they must not only improve the metal made under present methods, but new methods and new qualities must be sought and found.—[American Manufacturer.

FOREIGN locomotive-makers have so successfully imitated American makes that the exports for eleven months ended June 1 were only 54, as against 51 for the same time the previous fiscal year.

AN English inventor has devised a new system of generating steam, which furnishes steam, it is said, quicker and better than the present processes.

BESSEMER ORES.

Industrial World, Chicago.

A resident of Canada recently held an interview with the Business Men's Association of Buffalo with the apparent purpose of persuading them, if possible, that Buffalo is an excellent location for establishing a steel plant. This recommendation was based upon an accompanying statement that in the province of Ontario, Canada, there is a supply of a good quality of Bessemer ore, which could be mined and shipped to Buffalo at a low cost. His estimate was that "the total cost of the fuel and ore in Buffalo" would be $10.55 per ton. The IRON TRADE REVIEW, published at Cleveland, undertook on its own account to make an estimate of the cost of pig iron at Buffalo, taking the Canadian gentleman's figures for the purpose, and found the cost would be $12.50, adding to these figures the interesting inquiry "whether in quantity or quality the proposed source of supply rests on a sufficiently certain basis to render the above calculations reliable."

There are several considerations connected with this subject which it might be well to take into account. The inhabitants on the hither and thither side of the Niagara River live under different systems of government. At present, relations of amity exist. How long will they exist? The fisheries question may be settled without resort to force, but no one can guaranty that it will be. Who can assure capitalists on this side that raw material for the proposed steel plant will be always accessible, or that, once in demand, the price will remain where it will yield a durable profit to the importer?

The policy of the government on this side of the line has been continuously for more than a quarter of a century in favor of the development of raw material at home for all manufactured products. The wisdom of this policy is in part illustrated by the development of the Gogebic and Vermilion ranges of Bessemer ore. Are not these ranges, with their accessibility to the chain of great lakes a better guaranty of cheap and durable supply for Buffalo steel manufacturers than any which the Dominion of Canada can promise?

A few weeks ago complaint was made to the U. S. Secretary of the Treasury that certain skilled laborers—carpenters, painters, plumbers, etc.—living on the Canadian side of Niagara Falls were permitted to come over on this side in the morning, perform their day's labor, go back at night, and thus without contributing anything to the support of local or general government, compete with American laborers who bear this burden of governmental support. The Treasury Department, in execution of the laws of Congress, stopped the ingress of Canadian laborers. Would not Canadian labor employed in the Ontario iron ore mines compete with American labor in American iron mines if Buffalo steel manufacturers should buy their ore on the other side of the border?

Puttying Cracked Government Steel.

An instance of the working of the method of inspection of steel for the new cruisers has recently come to light. A number of very important castings were made for the machinery of one of the ships and were passed as satisfactory by the steel inspector after a tensile test of specimens cut from them. When the casting arrived at the shipyard the engineer inspector found that every one of the castings was cracked in an important part, and that the cracks had been filled with putty and painted over to look like the remainder of the castings. It is needless to say they were rejected, although the manufacturer claims that it is impossible to make the castings without blemish, and that those submitted were of sufficient strength to answer the required purpose. The contractor has requested the Navy Department to make a further modification of the prescribed tests, so that the rejected castings may be admitted.—[Army & Navy Journal.

The Outlook for 1888.

Iron Age.

Through published interviews and privately a goodly number of the leading manufacturers of steel rails in the United States have avowed their belief that the demand for their product for 1888 will not be as great as it was in 1887. They look forward to the future with some anxiety, and in isolated cases time has been taken by the forelocks by efforts to capture orders at tempting figures for 1888 delivery. Still, little business has been placed, and it is yet far too early to form even an approximate idea as to what extent there will be a falling off in the demand. Beyond the general impression that fewer orders will be given out, everybody is still at sea, and it is possible that pessimist views are temporarily unduly prevalent.

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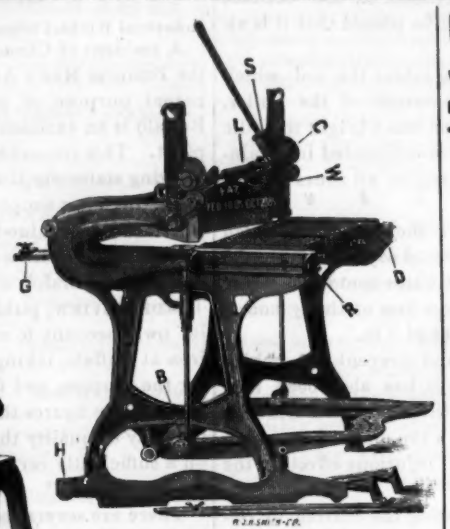

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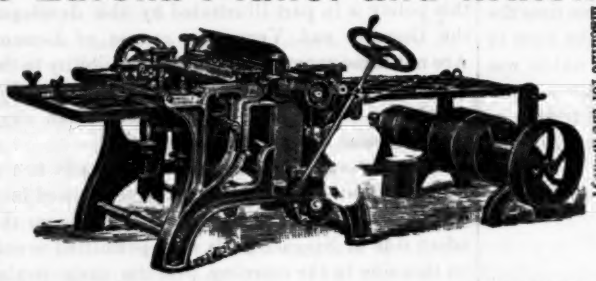

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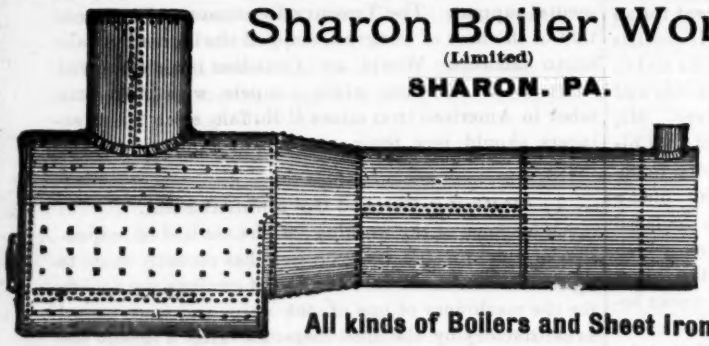

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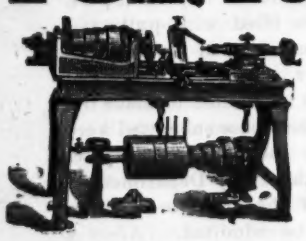

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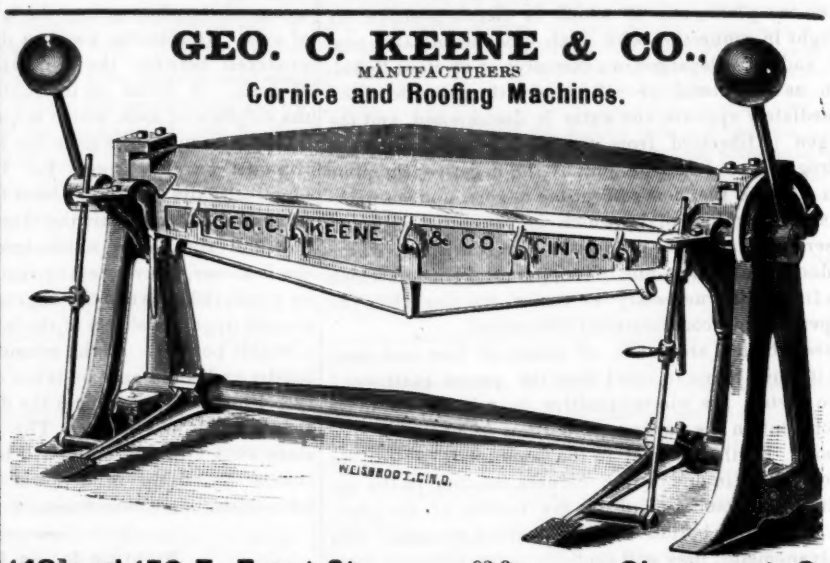

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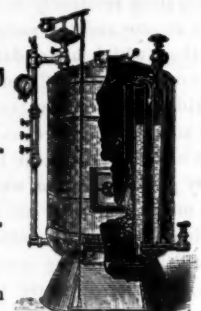

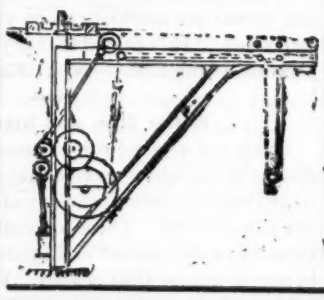

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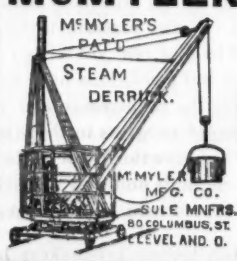

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PETROLEUM AS A BASIS FOR GAS FUEL.

Emerson McMillin in American Manufacturer.

The interest felt by the public in gas fuel causes everything on that suject to be read with avidity. When new sources of possible supply are suggested, the suggestions attract much more attention than they would if made a few years ago.

Water gas, so-called, has been prominently before the people for some years, and is making some progress—more, however, as the basis or carrier for illuminants than for fuel purposes. This is doubtless due to the fact that with most of the forms of apparatus in use only anthracite or coke can be successfully converted. Had it been possible to use bituminous slack in the water gas generators, during the last ten years, with the ease the same material is used in producer furnaces, thousands of them would now be in operation. That a system will be invented and put into use that will meet the demands of the times can hardly be questioned.

Recently, I have read one or two articles from the pen of Mr. Lorin Blodget, originally published in *Light, Heat and Power,* and republished in the *Petroleum Reporter* department of the *American Manufacturer,* setting forth the value of petroleum as a source of heat, and also calling attention to the apparatus said to now be successfully converting crude oil into heating gas of great power.

Anything from the pen of Mr. Blodget commands attention and respect, yet it occurs to me that in this instance he has possibly over-estimated the possibilities of crude oil becoming a great factor in the heating problem, and possibly, also, the value of the apparatus for converting the oil into gas, which he describes and illustrates. He puts the present supply of crude oil at 7,000,000 tons per annum.

The most reliable statistics of the petroleum industry of New York and Ohio, to which I have access, show up as follows:

	Production.	Consumption.	Stock at end of year.
1882	30,4 0,000	21,8·3,072	34,596,612
1883	24,300,000	22,096,612	36 800,000
1884	23,500,000	23.500.000	36,800,000
1885	20,900,000	23 900,000	33,800,000
1886	26,141,196	26.532,195	34.156,605
To July 1, 1887	11,692,508	13,072,429	32 389,750

These figures show the consumption during the last six months to be nearly 1,500,000 barrels more than the production, and this, too, when none worth mentioning is being used for heating purposes.

If the statistics above are correct, then it appears that the average production for the last five and one-half years is less than 25,000,000 barrels per annum, which, putting forty-two gallons to the barrel and 6·25 pounds to the gallon, gives us only about 3,250,000, instead of 7,000,000 tons—the weight of which Mr. Blodget estimates the annual production. This, then, makes the average production but 70,000 barrels per day. Now, let us suppose that the production may be doubled, and the demand for present uses not increased, we would then have 70,000 barrels per day for the purpose of gas-making. Mr. B. puts the production of gas at 1,000′ from seven gallons of oil. If seven gallons of oil is good for 1,000′ of twenty-two candle gas, then the 70,000 barrels would make 420,000,000′ of gas of about the same calorific value as natural gas, and the estimated production about equals the daily consumption of Pittsburgh alone.

The articles referred to use forcible arguments in favor of gaseous fuel, and they will doubtless have weight and influence with the thinking public who may be fortunate enough to read them. The statement, however, that coal cannot be as cheaply put into gaseous fuel as can oil is an error. It will cost very much less to convert the carbon of a ton of coal into CO, than it costs to make a permanent gas out of a half ton of oil. If it is a fact that it will make gas far superior to coal, and at a price as cheap as natural gas in outlying towns, the gas companies have been stupid not to have discovered that fact.

I am not sure that I comprehend Mr. Blodget in his claim for an additional source of heat in gaseous fuel, in the union of oxygen and hydrogen, and certainly not in his application to the blast furnaces. He says: "And it is also probable that producer gas, as well as coal gas of every sort, cannot be adapted to the oxy-hydrogen combustion or be used in direct connection with it." I wish he had elaborated this point a little more. I had never supposed that either producer gas or coal gas could be consumed without oxy-hydrogen combustion, if by that term he means the combustion of hydrogen by oxygen.

I question if he gave much consideration to the assertion that "the heat possible from coal or carbon in any form, solid, fluid, or gaseous, may be intensified at least five times by the oxy-hydrogen flame," before publishing it.

Thousands of experiments have been made in the attempt to use liquid fuel; all of them, perhaps necessarily, converted the oil into gas before combustion took place.

From purely an economic standpoint this should be done near the point of combustion, but this is not always convenient. For domestic use, and for the lighter industrial purposes, it will be necessary to convert the oil to gas and conduct it through pipes a shorter or a longer distance.

If Mr. Newell has succeeded in making an apparatus that will do this work, and make the gas at a less cost per heat unit, he is taking a step in advance of the other gas engineers, and deserves financial as well as scientific and mechanical success. It remains, however, to be seen whether the apparatus covered by patent No. 314,871 will prove to do the work economically.

Steam cannot be heated to a high temperature in iron pipes without destroying the pipes.

To vaporize oil by steam is certainly expensive—more expensive than by any other imaginable system, particularly if the steam so employed be not further utilized by being converted into CO and H by dissociation.

I would prefer any of the systems now in use for making carbureted water gas to the Newell system, as I now understand it. These various systems can, by increasing the quantity of oil, make gas of as high caloric value as can be made by the Newell apparatus. Except in localities where coal is very dear and oil is very cheap, producer gas, with an intensity of temperature high enough for all industrial purposes, can be made from coal far cheaper per heat unit, in my opinion, than the Newell gas can be made. There are localities where oil gas can doubtless be used with profit, and I shall be disappointed if some good does not grow out of the agitation of the question by Mr. Blodget.

Causes of Boiler Explosions.

We are aware of the fact that in entering upon the subject of boiler explosions we are venturing upon what is generally regarded as dangerous ground, but we have a theory on which we feel safe in venturing a little reputation.

When we read, at the end of an account of disastrous explosion, that there was an abundance of water in the boiler at the time the accident occurred, we do not question its truthfulness. A fatal accident of a different nature which happened in this city recently, illustrates our theory of boiler explosions. A freight elevater designed to carry with safety 80,000 lbs., fell with no other weight than that of one of the proprietors, a man weighing less than 200 bls. upon it, inflicting injuries from which he died. The absurdity of looking at the unfortunate victim for the cause of the accident will be at once acknowledged.

So it is with boiler explosions. The boilers are weakened from one cause and another, and then rapidly grow weaker, and the ultimate effect is an explosion under circumstances not at all suggestive of danger, there being, perhaps, plenty of water and no extraordinary pressure. We believe that the recurrence of low water, of which the proprietor, and often the engineer knows nothing, in the absence of a trustworthy alarm, is the most potent cause of boiler explosions, and hence that automatic, low water alarms are necessary to safety.

The experience of users of the Reliance Safety Water Columns shows that the low water alarm is sounded about once a month on the average, notwithstanding the extra watchfulness on part of the attendants which these alarms naturally induce, and it stands to reason, that the frequent recurrence of low water has a fatal effect, and that anything which can be relied upon to obviate it is a very desirable investment.—[Reliance Gauge Co.'s Catalogue.

Corrugated Iron Casks.

Casks made of corrugated and galvanized sheets are now being introduced in Germany for the transport of liquids which are liable to expand considerably with a rise of temperature. They are lighter than wooden ones and last much longer. The corrugations of the sheets run parallel with the hoops, which are either iron bands lined with wood or iron tubing. All joints are double-riveted and soldered, whilst the bung and spigot holes are provided with screw plugs. They can stand an internal pressure of 30 lb. to the square inch, and are now being used for the transport of oil, petroleum, benzine, spirits, and quite recently also for beer.

EMPLOYER AND EMPLOYED.

A Mechanic in the Erie (Pa.) Dispatch.

Your editorial in a recent issue urging the importance of candor between employer and employed is a well-made effort in the right direction. Good natured every-day newspaper talk between employer and employed in helping these men to become acquainted. There is a joke about a business man having no time to become acquainted with each other is too near literal fact to form the basis of a joke, and this fact is a most potent cause in labor troubles.

Confidence in the sincerity and good intentions of our fellow-men is a prime necessity in business transactions, and confidence requires acquaintance, either personal or by voucher. The relationship of employer and employed is that of business; one wants to sell his labor, the other wants to buy; and, on the immediate conclusion of the contract, or, as the workman is about to begin work, each is pleased with the other and has high hopes of the future. Why is it that this acquaintance, so auspiciously begun, cannot continue? Why is it that this profitable and happy feeling so often turns to discontent, distrust and misery?

Can it be there is anything radically wrong in one man working for another? Assuredly not. Each man doing all the work necessary to supply his own wants would be an absurdity. I cannot make my own shoes; I employ a shoemaker and he works for me. When ill I employ a physician and he works for me just as certainly as I work at my trade for my employer, and I am just as free and just as independent as any other citizen of these United States.

No, there is nothing wrong in the principle of one man working for another.

I said that the relationship of employer and employe was one of business, but, various circumstances govern the manner of doing business. In buying and selling goods the buyer holds the money which the seller seeks to get and the buyer is master of the situation. The seller takes the lead in affable and courteous manners and seeks to please his customer, and the latter, not to be outdone in suavity, takes pains to do his best, so that mutual good will prevails, and, as the transaction is short, this feeling is not put to the test of ten hours a day for six days in the week as it is in the case of a workman and his employer.

Another advantage the merchant has is that the goods are on hand ready to exhibit, and he can point out their good qualities and give 'hem a high standing withou fear of egotism. The workman cannot show a sample of his day's work without first taking a day for its accomplishment, and then it will not do for him to praise his work as the merchant does his goods, nor will it do for him to warrant in advance all following to be like a certain sample. A day's work is subject to many accidents and delays which the wisest man cannot always foresee, and workmen regret such accidents and delays more than they get credit for. It is in the nature of the business that the employer should look for the faults, and in course of time with much practice he becomes very expert in that line.

I once had a lot of one hundred and forty-nine pieces of important work, in which all but two pieces were fully up to the standard, and these two would fully answer the purpose well enough, but I wished them a little better. But the die was cast, and the lot stood on the floor where my employer, with a mere glance at them picked out the very two at first, which I would rather he had seen last.

I have sometimes wondered how it would do for the the employer to point out the good work first, giving the workmen a chance to confess his failings. Would the workman do it? Would I have pointed out to the two pieces if my employer had only spoken of the good ones? I cannot answer, but certainly the candor and confidence which such a course would have implied would be a desirable condition of feeling between employer and employed, and such a situation of affairs would enable both to be at their best.

The Effect of Temperature in Steel.

At 570 degrees a dark blue color is produced upon polished steel, which is changed to a pale blue at 590 degrees. Oil or grease of any kind will answer for drawing the temper of cutlery. The temper for lancets is obtained at 430 degrees Fahr., axes at 500 degrees, swords and watch springs at 530 degrees, small saws at 570 degrees, and large saws at 590 degrees. Copper-colored spots are not produced by tempering, but they may be obtained on the polished surface of steel by immersing the article in a solution of sulphate of copper.

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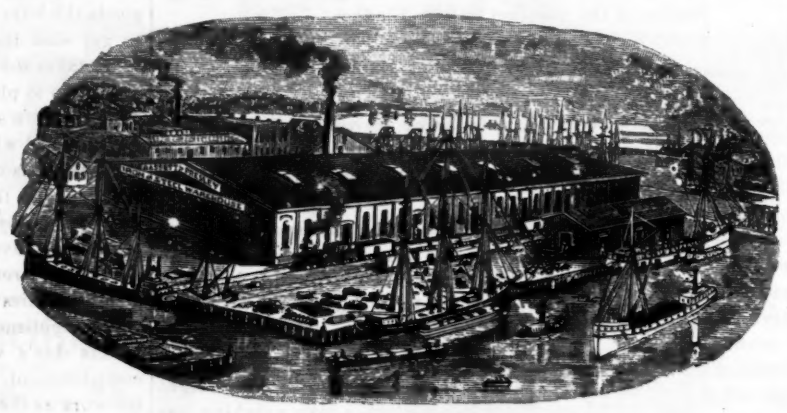

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Industrial Notes

Blast Furnaces:—

Riter & Conley, of Pittsburgh, manufacturers of boilers, etc., have just finished eight boilers for the Colorado Coal and Iron Company, of South Pueblo, Col., who are erecting one of the largest furnaces in the West. The upper boilers are 65 feet long and 40 inches in diameter, while the lower ones are 45 feet long and 32 inches in diameter.

Furnace No. 1 of the Missouri Furnace Company is working quite as well as had been expected, according to Col. McNair. The improvements made upon her by Messrs. Gordon, Strobel & Laureau, of Philadelphia, have increased her productive power by 35 to 40 per cent., and effected a material saving in fuel. The other stack of the company, which is idle pending the making of some necessary repairs and useful alterations, will be restarted in about a fortnight. The demand for Bessemer is reported to be good, sufficient to take up the State's product without trouble.—[Age of Steel.

Steel Works:—

The new steel plant of the Waugh Nail Co., of Belleville, Ill., was put in blast for the first time on the 31st ult. The plant cost $150,000. The output is 75 tons of steel per day.

A meeting of the Spliced Rail Joint Company, of Pittsburgh, will be held October 11th, to vote on a proposition to increase its capital from $100,000 to $500,000. The growth of the company's business requires more money, and it is probable a new steel mill for the manufacture of the invention will be provided for.

A special dispatch from Johnstown, Pa., dated September 5, says: "The Johnson Steel Street Rail Company, of this city, whose developement has been remarkable, have secured an option of thirty days on the Von Luenen tract of land situated south of the city, agreeing to pay therefor $50,000. The tract embraces 220 acres. They propose erecting their works there, building rail mills, blast furnaces, etc. Mr. Moxhall, general manager of the firm, is now in England."

Three of the six departments of the Western Steel Works are idle just at present, as extensive repairs are in progress. The departments that are idle are the rail mill, bloom mill and converting department. Those that continue uninterrupted are the blast, foundry and machinery departments, giving employment to 900 men. The engine that furnishes the power to the train of rolls in the bloom department, a Porter-Allen make, is being overhauled, the cylinder exchanged for larger capacity. The old cylinder is 28x40 and is to be replaced by one 38x48. The Fulton Iron Works have the contract. The rolls known as movable rolls are to make room for new rolls of approved pattern called positive rolls. With the movable rolls the hot metal had to pass through fourteen times, while with the positive only eight passes are required, which increases the working capacity of the bloom mill nearly 40 per cent. These changes, with the others made a few weeks ago, place these works along side of the best of them, for these works have now all the latest and best appliances for the making of steel in the country. The company figure on starting up in full blast again by Friday or Saturday, when their full complement of employes, 2,000 hands, will be put to work.—[Industrial Gazette, St. Louis.

Machine Shops:—

The machine shop and foundry of Miller & Bokenkamp, at Fort Madison, Iowa, will be rebuilt at once.

About $7,000 of the $20,000 wanted to start the Ulrich engine works in Northampton, Mass., has been pledged.

The Du Quoin Iron Works, Du Quoin, Ill., are perfecting a machine for making a barrel with only one stave.

It is said that a machine shop, 175x45 feet, will be erected at Mauch Chunk, Pa., by the Lehigh and Susquehanna Railroad Company.

A permit was taken out on the 7th inst. by James Rees for a machine shop at the corner of Fourth street and Duquesne way, Chicago. The buildings will cost $6,500.

The Reliance Guage Co., of this city, are about to add a high steam alarm to their Safety Water Columns which will act independently and make no doubt the most complete safeguard of the kind ever offered to the public. With this feature added their safety water columns include both high and low water and high steam alarm all combined but entirely independent of each other and each working automatically. We hope to present an illustration of the new invention at an early date.

Messrs. P. G. Marche & Co., and the Universal Radial Drill Company, of Cincinnati, Ohio, will on the 20th inst. remove from their present location, Eighth and Sycamore streets, to the large and commodious quarters known as the Kilgour Shop, Third, Lock and Eggleston avenues. The new quarters will give them ample facilities for the production of their special machines, having a frontage of 196 feet on Eggleston avenue, 70 feet on Third street and 196 on Lock street. The building is four stories in height and is supplied with ample water and steam power.

Foundries:—

A charter has been granted to the Duquesne Tube Works Company, of Pittsburgh, Pa. The capital stock is $100,000.

The Smith, Beggs, & Ranken Mfg. Company, of St. Louis, Mo., have just cast a pulley which is 24 feet in diameter, has a face of 4 feet 4 inches and weighs 75,000 pounds. It is intended for the Howard Oil Mill, of Houston, Tex.

There doesn't seem to be any diminution in the volume of business doing at local foundries, machine shops and boiler works. Every establishment, large or small, comprehended in this statement continues uninterruptedly busy, and at some orders have increased. Increased activity is especially noticeable at places where copper and iron are worked into tanks, mash tubs, piping, etc., for the breweries. Among the foundries the greatest measure of improvement is discoverable, at the stove works, of course, where production is aided by the return to work of some of the employes who struck last March for an advance of 15 per cent. in their wages. A rough estimate places the weekly make of cast stoves in the city at 3,500, but 2,500 would probably be nearer the mark.

Fires in Iron Works:—

Harrison's foundry at Mason City, Iowa, together with all the machinery, was burned Monday night. Loss, $35,000.

The works of the Michigan Axe and Tool Company, in East Saginaw, Mich., were burned on the 3d inst., involving a loss of about $30,000.

Miscellaneous:—

The Empire Carbon Works, East St. Louis, Mo., have filed articles of incorporation. The capital stock is $40,000 and the incorporators are George Beck, Max Dietrich and William E. Fisse.

The Glen's Falls (N. Y.) Board of Trade have agreed on measures for the formation at once of a stock company to erect a large building furnished with ample steam power for rental to small manufacturers.

The Mississippi River and Ocean Navigation Company has been incorporated at Alton, Ill. Capital stock, $5,000,000; to construct and operate ocean and river steamships. Incorporators, Andrew H. Lucas, John F. Cahill and Wm. Lucas.

According to the *Pioneer-Press*, forty manutacturing establishments have located in the city of St. Paul, Minn., within the past eighteen months, adding about five million dollars to the manufacturing capital of the city and over 35,000 souls to the population.

The Reliance Gauge Co., of this city, reports the demand for their Safety Water Columns picking up wonderfully since the first of the month. This is probably the natural result of heavy advertising during the dull season, resulting in wide spread orders, now that the season for setting and equipping new boilors in establishments built during the past summer has arrived.

Middletown, Pa., will erect shortly a galvanizing works which will employ 200 additional men. A superintendent from Bay City, Mass., has already been employed, and the building will be pushed to completion. In about a year a rolling mill to employ 1,000 men will also be constructed. The pipe works have been a great boon to Middletown, 300 new houses having been erected within the past two years.

R. K. Porter & Co., of Pittsburgh, manufacturers of light locomotives, have received some heavy orders recently for street motors. The firm are running their works to their full capacity, with good prospects ahead. In an interview with the superintendent of the works, he said: "These street motors, or 'steam dummies,' as they are called, are becoming very popular. In several towns in the South and West horse cars and electric roads have been abandoned. We are now at work on small motors for Birmingham and Selma, Ala., Wichita and Wyandotte, Kan.; Memphis, Sioux City and other points in the West. These engines cost from $3,600 to $5,000. We have many inquiries, but our works are crowded. We just shipped a light locomotive for work on a plantation in Mexico."

Chances for Contracts:—

Engines, Boilers, shafting and mill machinery.—At Bremen, O., engines, etc., for a roller process mill.

At Cuyahoga Falls, O., machinery for a planing mill on E. H. Strong's land.

At Mogadore, O., new mill machinery.

Iron Bridges—Bids will be received up to October 5, by the Commissioners of Putnam county for the building of two iron bridges, one 97 feet long and 14 feet roadway, across Blanchan river, and the other 110 feet long with 16 feet roadway, across the Auglaize river.

Iron Work for buildings.—Bids will be opened:

At Cincinnati, September 25, for a new engine house, for engine No. 15.

At Sharon, Franklin county, for a new school building.

At Cambridge, Guernsey county, September 30, for an eight-room school building.

At Cincinnati, September 21, for an iron portico at Longview Insane Asylum.

At Toledo, October 1, for a bath-house and industrial building at the insane asylum.

At Cincinnati, September 26, for an exposition building to be erected in Washington Park.

An Improved Process of Annealing Steel.

This modification is introduced by Mr. J. Dahl, of Kiel, Germany, and is described as follows in the *Industrial Review:* The pieces of steel to be annealed are placed in layers in a receptacle of iron or brickwork, the inner sides of which are coated with a freshly mixed mortar of dust of fire-bricks, and are strewn with white lead or oxide of lead, respectively. A quantity of fuel, consisting of a mixture of pulverized charcoal, turf, or crushed white beech-wood charcoal, intermixed with fine chips of forged iron, is spread on the bottom of the receptacle and a number of the steel pieces to be annealed, strewn with oxide of lead or white lead, are placed on it. On the latter are laid at certain intervals flat fire-bricks, and the intervals filled up with one of the said sorts of fuel, so as to completely surround the steel pieces. Subsequently a second layer of steel, strewn with white lead or oxide of lead, and again covered with fuel follows, then a third layer, on which are laid in the above described manner fire-bricks and fuel, care being taken that the single layers of steel may be, as far as possible, of the same thickness. This is continued until the receptacle is filled, when it is closed by a cover, coated with fire-brick mortar.

Subsequently the receptacle is exposed for about one and a half or two hours to a charcoal fire, until its walls, if they are of iron, appear dark red. Now the fire is covered or damped, and the receptacle allowed to slowly cool. The whole process lasts about six or eight hours. The purpose of strewing the steel pieces to be annealed with white lead or oxide of lead is believed to be thus explained. With the heating of hardened and so-called special steel for the purpose of easier working, oxidizing influences frequently occur, produced partly by noncombusted air in the fire, partly by the formation of silicic acid. By the presence of silicic acid between the molecules of the steel, the tenacity of the same decreases considerably, while its hardness is increased. The silicic acid is removed during the annealing process by combining with the oxide of lead to form silicate of lead, whereby the steel becomes extraordinarily soft and richer in its contents of carbonic acid under the influences of the glowing material.

The complete novel in *Lippincott's Magazine* for October is "Apple Seed and Brier Thorn," by Louise Stockton, the sister of Frank Stockton, a pleasantly told story, with an ingenious plot. There are two short stories, "Abel Perry's Funeral," a biting satire on the mania for extravagant funerals, by Josiah Allen's Wife, and "Zobeide, the Snake-Charmer," a weird, strange story, by Annie Robertson Noxon. "Literary and Social Recollections of W. D. Howells" is an entertaining bit of biography, by L. R. McCabe, a friend of the novelist's.

There is an enormous increase in shipments of Spanish ore to Great Britain. It is worth about $2.75 per ton in wales.

THE PORTER-HAMILTON.

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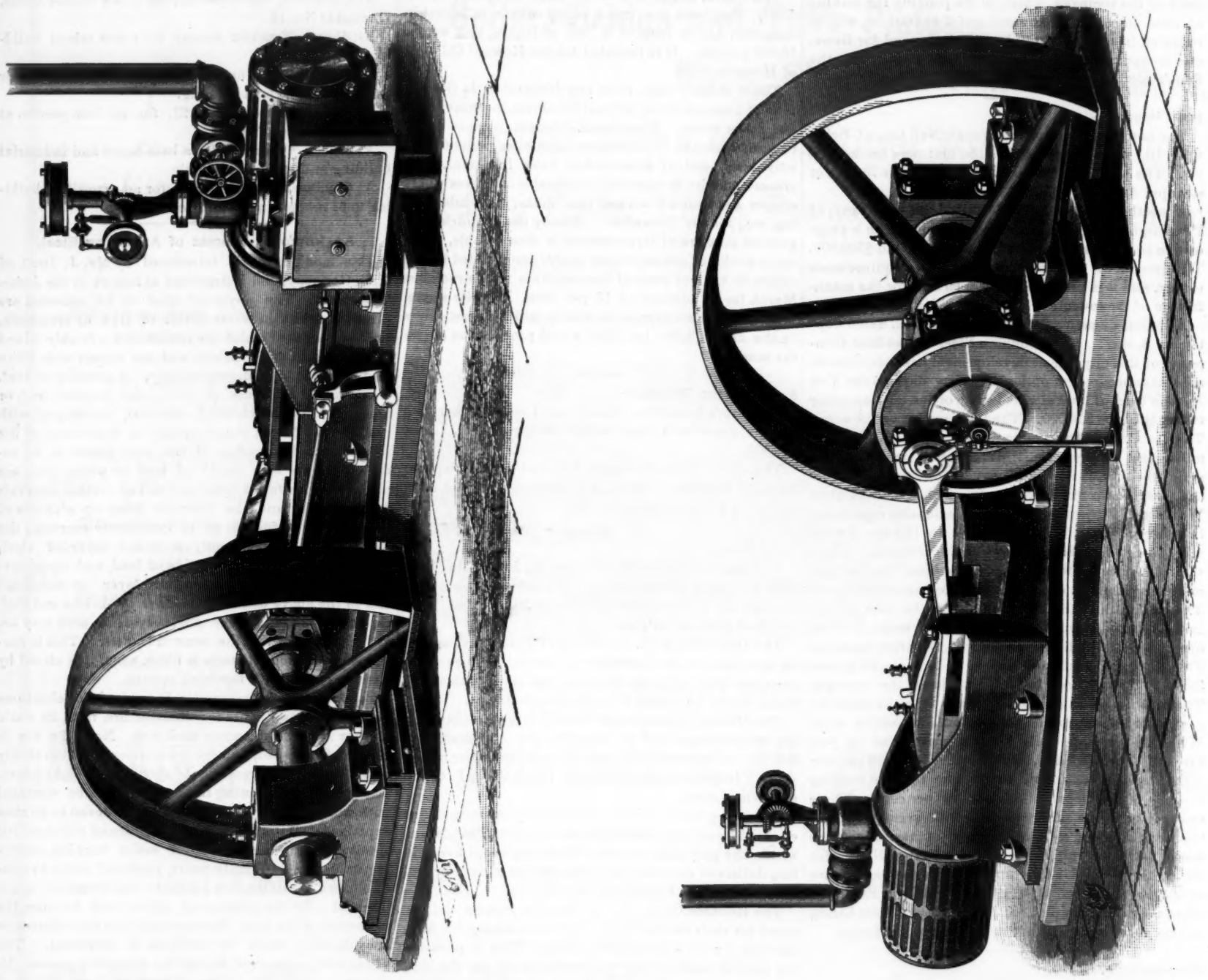
ROLLING MILLS, COTTON MILLS, PAPER MILLS, FLOUR MILLS, SAW MILLS AND GRAIN ELEVATORS.



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THE CINCINNATI STEAM HEATING CO. manfrs, dealers and contractors. Warming and ventilation of public and private buildings a specialty. Boilers, Radiators, Pipe, Fittings, Brass Goods, &c. Correspondence solicited. 187 West Pearl street. 92

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HATFIELD, JAMES, Pattern Maker. Patterns of every style made to order. 165-167 West Second Street. 95

BUSINESS DIRECTORY.

Canton, O.

NOVELTY IRON WORKS, Mill Work, Shafting, Engines, Imperial job printing press etc. 73

Hinckley, O.

ISHAM, W. S. Tin cans of every description Large job lots special prices. Correspondence solicited. 81

Meadville, Pa.

CURRY & CO. general jobbers in Castings of all kinds. 43

Mansfield, O.

MANSFIELD STEAM BOILER WORKS, Man'frs of Steam Boilers, Oil and Water Tanks, and all kinds of Sheet Iron Work. 03

Niles, O.

REEVES BROS., Manufacturers of Boiler, Tank and Sheet Iron Work, etc. 64

Rochester, N. Y.

WOOD-WORKING MACHINERY. Send for Catalogue. J. S. Graham & Co. 43

GLEASON, WILLIAM, manufr. of Machinists' Tools, Lathes, Planers, and Pat. Gear Dressing Machines. 10 Brown's Rac.

Struthers, O.

SUMMERS BROS. & CO., manufacturers of Box Annealed Common and Refined Sheet Iron, and Superior Quality Shingle-Bands. 61

IRON STOCKS.

Hussey, Hoyt & Co.,

Investment Bankers.

GOGEBIC IRON MINING STOCKS

A Specialty.

Full Information and Expert Reports for the use of Investors.

Hussey, Hoyt & Co.,

231 Bank St.,

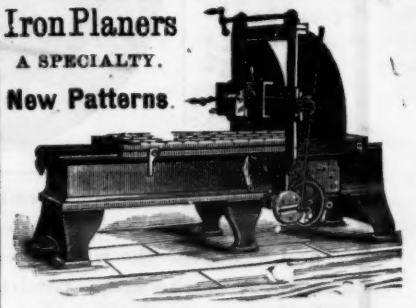
Mercantile Bank Building,

Cleveland, O.

Iron Planers

A SPECIALTY.

New Patterns.



This Planer returns the table 8 for 1.

Sizes from 20 in. by 20 in. and 30 in. by 30 in. to plane from 4 to 10 feet in length.

Rochester Machine Tool W'ks

LIMITED,

84 Rochester, N. Y.

White's Flexible Metalic

FILLET.

For PATTERN MAKERS, FOUNDERS & MACHINISTS

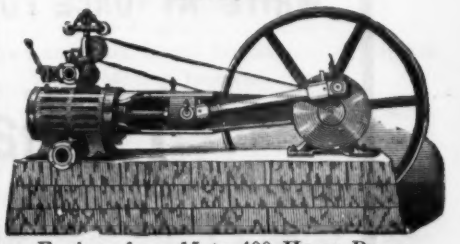
For Price List and Circular, Address:—

ALEX D. CUNNY,

132 & 134 E. Second St., - Cincinnati, O.

Stearns Mfg. Co.

ERIE, PA



Engines from 15 to 400 Horse Power.

Boilers of Steel and Iron

Supplied to the Trade or user. Send for Catalogue.

Saw Mill and General Machinery.

WORKS AT ERIE, PA.

Floats made for all but competitive gauge purposes.

THE RELIANCE

Safety Water Columns

Have now been on the market 3 years, and, having proved a perfect success, are there to stay, and are destined to

COME INTO UNIVERSAL USE.

They are already in use in every State in the Union, and in several foreign countries, and the demand for them is growing rapidly. They are being adopted by the largest institutions in the country, as well as smaller ones who do not employ skilled engineers.

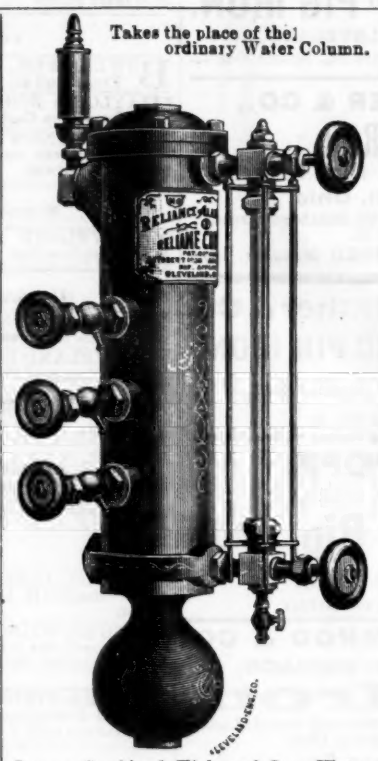
SEND FOR CATALOGUE

The Patent Solderless Copper Floats used in these columns are warranted neither to collapse nor fill, and the columns are sold under a positive guarantee of satisfaction. No alarm dependent upon common floats is trustworthy.

YOU WILL MAKE A MISTAKE

If you do not investigate the merits of these safeguards before buying any kind of Water Column. Their cost, above what necessity requires, is small, and they reduce the danger of damage from both low and high water to a minimum, and offer protection which cannot be found in any other appliance.

Takes the place of the ordinary Water Column.



Low or Combined High and Low Water Alarms. Elegantly Finished. Prices Reasonable.

These safeguards contain either low or combined high and low water alarms and embody all the improvements that long experience has suggested, and are perfectly reliable, under all conditions, and never get out of order.

YOU ARE MISTAKEN

If you suppose these safeguards relieve attendants of any responsibility, or that they will depend upon them and neglect their duty. They do not want their employers and fellow workmen to hear the alarm and invariably take extra care to keep the water at the proper level, knowing that it will not whistle if they do so.

Low pressure boilers need protection. They are generally left alone more or less of the time, and whenever the water becomes low they are subject to the same conditions under which high pressure boilers explode. Low pressure and low water are foreign to each other.

Should the pump give out, injector get out of order, water supply be shut off, or the water in the boiler from negligence or any other cause, get down to the lower or up to the upper gauge cock, an alarm will be sounded.

It is our ultimate object to deal wholly with the trade, which includes **Boilermakers, Engine Builders and Steam Fitters,** as well as general dealers, with all of whom we are ready to co operate, but we cannot afford to lose any opportunity to place these Safeguards in new territory, as columns in operation are our best advertisements. We therefore trust that all steam users who have not been approached on the subject will write us and take advantage of the special inducements we are offering to get them introduced.

The trade everywhere can handle these Safeguards with satisfaction and profit, and without risk, as they supply an actual need, and we support all dealers in guaranteeing satisfaction. The harvest time is at hand, as boilers are now being placed in establishments built during the past summer.

WRITE AT ONCE FOR ILLUSTRATED PRICE LIST, TERMS AND DISCOUNTS.

Reliance Gauge Company,

SOLE MANUFACTURERS,

29 Euclid Avenue, CLEVELAND, O.

These solderless floats render the columns permanently reliable.

MARKET REVIEW.

OFFICE OF IRON TRADE REVIEW.

CLEVELAND, O., FRIDAY EVENING, September 23, 1887.

Iron Ore.

Our forecast of last July seems to have been verified much sooner than was reasonably expected. It was then stated that the extraordinarily high and disproportionate freight rates from the Lake Superior country would retard mining among the middle class of operators, while it had a tendency to prevent the opening of new mines. The result is now apparent and furnacemen who did not take timely precautions are liable to be caught short. Inquiries for all manner of ore continue to be received by ore dealers, but no sales of any considerable quantity are recorded. In some lines there is nothing to sell, and a leading dealer in Bessemer ores had to decline an advantageous offer made by a Wheeling furnace firm for a large lot of soft ore. Inquiry develops the fact that the larger mines have long ago been sold up quite closely, and that there is no wild ore that can be reached. There may be plenty of it in the Lake Superior country, but it cannot be brought down and so entails loss on the producers, while it is of no avail to furnacemen whose scarcity of orders last winter did not justify them in the purchase of very large quanties of ore for long future delivery. The receipts during the week aggregate 50,534 tons, compared with 15,591 tons during the corresponding week in 1886. This week's shipments amount to 26,411 tons, as against 20,369 tons shipped during the corresponding week in 1886. We quote as follows:

No. 1 Specular and magnetic Bessemer ores per ton	$7 00@7 50
No. 1 Specular (non-Bessemer) ores per ton	6 00@6 55
Bessemer Hematites	5 75@6 70
Non-Bessemer Hematites	5 00@5 00

Pig Iron.

The demand in foundry and mill irons remains good and prices are quite full. It is conceded on all hands that the orders placed with furnacemen will keep them at work until the close of the year, and the prospect is good for the continuation of a good business. Lake Superior charcoal irons are rather weak and there is little inquiry for them. Some large sales are reported for the week, among them being 2,000 tons of mill iron and 3,500 tons of high grade foundry iron, all at full prices. At the request of Cleveland furnacemen we quote the following prices for Cleveland-made iron, four months, f. o. b., in distinction from the quotations ruling in the Mahoning Valley:

No. 1 Bessemer, $21.50@$22; No. 1 foundry, all lake ores, $21@$22, at which a sale of 1,200 tons is reported; No. 2 foundry, $20@$20.50. Mahoning Valley is quoted as follows, four months, f. o. b. in Cleveland:

CHARCOAL PIG IRON.	
Nos. 1 and 2 Lake Superior charcoal	$23 00@24 00
Nos. 3 and 4 Lake Superior	23 00@24 00
Nos. 5 and 6 Lake Superior	23 00@24 50
BITUMINOUS AND COKE IRON.	
No. 1 Bessemer	$ 21 85
No. 1 foundry, all lake ores	21 35@21 85
No. 2 same	20 35@20 85
No. 1 foundry, lake ores, with cinder mixture	20 85@21 35
No. 2 same	19 85@20 85
No. 1 silvery, native Ohio ores	21 00@21 50
No. 2 same	20 00@20 50
No. 1 gray forge, red short	20 35@20 85
No. 1 gray forge, neutral	18 85@19 35
No. 1 American Scotch (Black Band)	21 35
No. 2 American Scotch "	20 35

Manufactured Iron.

No change is reported in the sale of bar iron, for which the demand is not nearly as lively as the trade would seem to warrant. Bars sell at $1.85 at the mill and $1.90 out of store, although for choice qualities $2.05 was obtained during the week. Sheets continue in active demand at the old quotations and there is a scarcity of stock.

Scrap Iron.

Old American rails sell at $25@$25.50 and old wheels are offered at $21.50. A sale of 300 tons of axles is reported at $27 and a sale of 300 tons of wrought scrap at $21.50.

Hardware.

Shelf goods experience an excellent season in every line. Metals are very firm, especially tin plate and zinc. White lead sells at 6½c. and pig lead at 4¼c. There has been an advance in axles, the former discount of 60 per cent. having been reduced to 50 per cent. The discount on bolts is now 70 and 10, the same as on wood screws. Steel goods have advanced throughout the list and the discount for 1888 will be 65 and 5.

GAS PIPE..—The following are the discounts quoted: Small black, 50; large black, 60; galvanized small, 40; galvanized large, 45.

CUT NAILS.—The market is dispirited and the prices, $2.10 for iron and $2.20 for steel are being shaded to procure business.

CHICAGO PIG IRON MARKET.

Reported for the IRON TRADE REVIEW by Rogers, Brown & Co., W. W. Backman, Resident Agent.

The demand for soft irons is a little less pressing than during the few weeks past, indicating that buyers do not find it so difficult to supply their wants. Southern irons are offered a little more freely than previously, and one or two good-sized contracts are reported. While Southern irons are somewhat irregular in their offerings in this market, the quantity used is large and growing, contracts being usually placed for large amounts, while Ohio soft irons are bought more from hand-to-mouth. Expectations as to abundance of supply from the Mahoning and Shenango valleys after the full resumption of the furnaces are disappointed to some extent. The furnaces in those districts are not free sellers, most of them having engagements to take much of their product for the remainder of the year. Old rails are in light supply and are held firm. The quantity of this material being offered is sensibly decreasing, and the time is not far distant when it will cease entirely, as the roads now are almost completely relaid with steel. There is no sign of abatement of consumption in any quarter, and a heavy Fall business is looked for. We quote for cash f. o. b. cars, Chicago (September 17)

Coke and Coal Foundry:—Ohio Hanging Rock softeners, No. 1, $21 50@22 50; Ohio Jackson county, softeners, No. 1, $21 50@22 50; Ohio, Black Band softeners, No. 1, $22 50@23 50; Lake Ore and Cinder softeners, No. 1, $21 00@22 00; Southern coke foundry No. 2, $21 00@22 00; Southern coke foundry No. 2½, $20 50@21 50; Southern coke foundry No. 3, $20 00@21 00. Old Materials:—Old American Rails, $24 00@25 00; Old wheels, $20 50@21 50. Charcoal Foundry:—Lake Superior, $22 50@23 50; Southern, $22 50@23 00; Hanging Rock, $24 50@25 50. Car Wheel and Malleable:—Lake Superior, $22 50@23 50; Standard Southern, $24 00@26 50; Hanging Rock Cold Blast, $27 00@29 00; Hanging Rock Warm Blast, $23 50@24 50.

CINCINNATI PIG IRON MARKET.

Reported for the IRON TRADE REVIEW by Rogers, Brown & Co.

Orders have continued to run in small quantities during the week, but there have been a great many of them. The buying at this season is in marked contrast with that of a year ago. At that time prices were very low, but the tendency was strongly upward, and many very large contracts were made, some of which are not even yet completed. This month the purchases are liberal, but they do not look far ahead, as a rule. Some buyers, taking a different view of the market from the prevailing one, have made contracts during the last week running to July, 1888. Briefly stated, the belief in lower prices is based wholly on present heavy rate of production and imports, while the confidence of sellers in maintenance of present values is based on the sound, general activity in all branches, but particularly in railroad building and equipment, the latter feature being regarded as sure to increase for another twelvemonth, at least. Three or four of the southern Ohio furnaces are reported banked from failure of water supply. The following cash figures cover closely the range of transactions during the week (September 19):

HOT BLAST FOUNDRY IRON.—Ohio and Southern Strong Coke. No. 1, $21 00@$21 50, Ohio and Southern Strong Coke, No. 2, $20 00@$20 50; Ohio and Southern Strong Coke, No. 3, $19 00@$19 50; Ohio Soft Stonecoal, No. 1, $20 50@$21 50; Ohio Soft Stonecoal No. 2, $19 50@$20 00; Mahoning and Shenango Valley coke, No. 1, $21 50@$22 00. CHARCOAL IRON.—Hanging Rock, No. 1, $23 50@$25 00; Hanging Rock No. 2, $22 50@$23 50; Tennessee and Alabama, No. 1, $22 50@$23 50; Tennessee and Alabama, No. 2, $21 00@$22 00. FORGE—Strong Neutral Coke, $18 00@$18 50; Mottled Coke, $16 50@$17 00; Cold Short, $17 00@$17 50. CAR WHEEL AND MALLEABLE—Southern Car Wheel Iron, $25 00@$26 00; Hanging Rock Cold Blast, No. 1, $25 00@$28 00; Lake Superior Malleable, $25 00@$26 00.

PITTSBURGH PIG IRON MARKET.

Reported for the IRON TRADE REVIEW by A. H. Childs.

During the past week pig iron has been fairly active and while many purchasers claim that the state of the trade demands some reduction in prices it is plain to all furnacemen that at present cost of pig iron any further concessions would entail absolute loss to producers. It is not likely therefore that any such change will occur, at least as long as the demand keeps fairly good. Quotations are (Sept. 19):

PIG IRON.—No. 1 foundry, $20.50@$21.00; No. 2 Foundry $19.50@$20.50; White and Mottled, $17.50@$18.00; Gray Forge, $18.50@19.00; Warm Blast Charcoal, $22.00@$24.00; Cold Blast Charcoal, $24.00@28.00; Bessemer, $21.00@22.00, four months.

DETROIT PIG IRON MARKET.

Reported for the IRON TRADE REVIEW by Charles Himrod & Co.

An extremely active market has existed during the past week, particularly for Lake Superior charcoal iron, and conside rable quantities have been placed in both small and large lots. There seems to be an anxiety on the part of buyers to get their iron in by navigation this month, as nearly all rates will advance October 1st. Southern and Northern Ohio coke irons are firm in price and any large lots for immediate delivery would be very hard to get. The prices they are receiving are evidently very satisfactory, as they are willing and anxious to contract for all of next year's delivery at present existing rates. On the whole we should say that the market was a strong one, and while no advances are noted, no cuts in prices are obtained on any grade. Car wheel men are demanding higher numbers of Lake Superior charcoal, owing to the difficulty in obtaining old wheels. We quote the market to-day (September 21) as follows:

Lake Superior Charcoal, all Nos. $23 00@$24 00; Lake Superior Coke, all ore, $22 50@$23 50; Lake Superior Coke, cinder mixed, $20 50@$21 50; Standard Ohio Blackband, $22 50@$23 50; Southern No. 2, $21 00@$22 00; Southern Silvery, open, $20 00@21 00; Jackson County (Ohio) Silvery $21 50@22 50; American old iron rails, $23 50@25 00; Old wheels, $20 50@21 50.

LOUISVILLE PIG IRON MARKET.

Reported for the IRON TRADE REVIEW by Geo. H. Hull & Co.

The market for pig iron during the last week has shown more activity than for several weeks back, and some large sales have been booked. Double the amount could have been booked at full prices, if furnaces were willing to accept offers. These inquiries and sales have been more particularly for choice brands of iron. There are still some outside lots and undesirable brands of iron that are offered without buyers, but the choice brands of the South are not in the market, except for odd grades. Prices have not changed, and we look for no immediate advance. We quote for cash as below (September 21):

PIG IRON.—Southern Coke, No. 1, Foundry, $20 50@$21 00; Southern Coke, No. 2, Foundry, $19 50@$20 00; Southern Coke, No. 2½, Foundry, $19 00@$19 50; Hanging Rock Coke, No. 1, Foundry, $21 00@$21 50; Hanging Rock Charcoal, No. 1, Foundry, $24 00@$25 00; Southern Charcoal, No. 1, Foundry, $22 00@23 00; Silver Grey, different grades, $18 00@$19 50; Southern Coke, No. 1, Mill Neutral, $17 75@$18 25, Southern Coke, No. 2, Mill, Neutral $17 00@$17 50; Southern Coke, No. 1, Mill, Cold Short, $17 00@$18 00; Southern Charcoal, No. 1, Mill, $18 00@$19 00; White and Mottled, different grades, $15 50@$16 00; Southern Car Wheal, Standard Brands, $25 00@$26 00; Southern Car Wheel, other brands, $22 00@$24 00; Hanging Rock, Cold Blast, $25 50@$26 50; Hanging Rock, Warm Blast, $22 00@$23 00.

ST. LOUIS PIG IRON MARKET.

Reported for the IRON TRADE REVIEW by Rogers, Brown & Co.

Buying in this market has been somewhat lighter, during the week past no sales of any size being reported. Some of the largest consumers, however, are preparing to enter the market for liberal quantities. Offerings of iron are not heavy from any quarter. The Missouri furnaces are fully sold and Southern furnaces are busy to meet past engagements. Ohio irons are in very light supply. River navigation is still completely suspended from that quarter. Sellers of iron look for a good, steady market through the remainder of the year, basing their expectations on active and increasing work among the foundries and mills, and the fact that stock in consumers hands are, generally speaking, light. We quote for cash, f. o. b. St. Louis (September 17):

Hot Blast Charcoal Irons—Missouri, $21 00@22 00; Southern, $21 50@$22 50. Coal and Coke Irons—Southern, No. 1, $21 00@22 00; Southern, No. 2, $20 50@21 00; Ohio Softeners, $21 00@24 00. Mill Irons—Missouri, $19 50@21 00; Southern No. 1, $19 25@19 75; Southern No. 2, $18 75@19 25. Car Wheel & Malleable Irons—Southern, $24 50@27 00; Lake Superior, $24 00@25 00. Scrap &c., —Old Rails, $24 00@24 50; Old Wheels, $20 50@21 00; Connellsville Coke, East St. Louis, $6 15.

CHATTANOOGA PIG IRON MARKET.

Reported for the IRON TRADE REVIEW by Lowe & Tucker.

The features of general trade both in merchandizing and manufacturing remain the same as last report. Great firmness in prices and growing demand characterize the present condition of all lines. The present situation may be said to be satisfactory. The situation of the pig iron business looking at it from the producers standpoint ought certainly to be satisfactory. There is an increasing demand and some sales are being made at higher figures than ruled last week and $18.50 is now the inside figure at which No. 1 foundry is held; in fact there exists considerable more demand than there is ability of the furnaces to supply. The Rising Fawn will go in October 1st, and her production will exceed 100 tons per day and her general output heretofore has been an excellent grade of foundry iron.

LIST OF PATENTS.

Relating to Iron, Steel, Metal, Machinery, Hardware and Mining Interests.

Reported expressly for this paper by H. T. Fisher, (late Ex. U. S. Patent Office), Patent Attorney, 34 Blackstone Building, Cleveland, O.

BEARING DATE SEPTEMBER 13, 1887.

Metal-crimping machine, F. R Packham, Springfield, O.
Metal working machine, compound, L. Olsen & N. E. Burns, River Falls, Wis.
Nail-plate feeder, J. C Gould, Chicago, Ill.
Ore crusher, P. S. Balkcrill, Cleveland, O.
Sheet metal press for cutting and stamping articles of, N. C. Stiles, Middletown, Conn.
Shingle-sawing machine, W. J. Perkins, Grand Rapids, Mich.
Wire and winding the same upon a cylinder, machine for cutting teeth in, D. B. Haselton, Charleston, S. C.
Wire-twisting machine, W. M. Augustine, South Bend, Ind.

Do You Own Any Mining Property?

DO YOU WANT THE PROPER MACHINERY

TO

Extract the precious Metals?

If so, send for Ciculars.

If You Need Capital For Such Purpose, Send Full Description of Mine and Ores.

Before purchasing machinery, we ask your careful investigation of our system of extraction. We can treat successfully All Classes of dry milling ores, free milling or refractory, as near the mine as fuel and water are obtainable. The chief principles we employ at one time are high pressure, high temperature in water--332° F.,--attrition, chemical action, motion; completely desulphurizing and decomposing the whole mass of ore, liberating the atoms of gold and silver, and preparing the same for perfect amalgamation.

DO YOU OWN A MILL!

ARE THE RESULTS SATISFACTORY?

If not, send for circulars. We can add machinery to a stamp mill that will extract a large per cent. of gold from the tailings. DO YOU CONCENTRATE? If so, we can also treat the product or concentrates at the mill, saving transportation, and extracting a high per cent. We refer to all grades of dry milling ores, not galena, copper or zinc carrying above 5 per cent.

Information Cheerfully Given.

CORRESPONDENCE SOLICITED.

MEECH & COMPANY,

CLEVELAND, O., U. S. A.

CLEVELAND WHOLESALE PRICES.

HARDWARE.

Anvils.

	per lb.
Eagle, American	10cts dis 20@20&5
Wrights	9¼
Armitage mouse hole	9
Armitage mouse hole extra	11¼
Wilkinson	9¼@10c

Anvil Vise and Drill.

Millers Falls Co. $18	dis 20
Cheney Anvil and Vise	dis 25

Augers and Bits.

Snells	dis 60&5
Cook's Douglass Mfg. Co	dis 55
Russell Jennings' augers and bits	dis 25
Expansive Bits, Clark's small. $18; large, $26	dis35@ 35&5
Hollow Augers, Ives'	dis 25&10@
Hollow Augers, French, Swift & Co	25 & 10& 5
Hollow Augers, Bonney's Adjust. ₱ doz. $48	dis 40&10
Hollow Augers, Stearns' Adjust. ₱ doz., $48	dis 20&10
Gimlet bits	per gross $2 75 @ $3.25
Williams or Holts Bit Stock Drills	dis 50&10&10
Ship Augers	dis 15@20

Awl Hafts.

Sewing, brass ferrule,	₱ gross $3.50, dis 45&10
Patent sewing, short	₱ doz $1.00, dis 40&10
Patent sewing, long	$1.20 ₱ doz net
Patent peg, plain top,	$10.00 ₱ gro., dis 45&10
Pat. peg, leather top,	$12.00 ₱ gro., dis 45&10

Awls, Brad Sets, &c.

Awls, Sewing, Common	₱ gross $1.70—dis 35
Awls, Shouldered Peg	₱ gross 2.45—dis 40@40&10
Awls. Patent Peg	₱ gross 63c—dis 40@40&10
Awls, Shouldered Brad	$2.70 ₱ gross—dis 35
Awls handled brad	$7.50 ₱ gro dis 45
Awls handled. scratch	$7.50 ₱ gro dis 35&10
Awls, socket scratch	$1.50 ₱ doz dis 25@30
Brad Sets. No. 42, $10.50; No. 43. $12.50	dis 70&10&5
Brad Sets, Stanley's Excelsior, No, 1. $7.50	dis 30&10

Axes.

Makers' and Special Brands—	
First quality	₱ doz. $6 75
Others	₱ doz. $5 75@$6

Axle Grease.

Frazier's, in bulk	keg ₱ lb 4c; pail 5c net
Frazier's, per gross	$9.50

Bag Holders.

Sprengle's pat.,	₱ doz $18 dis 60

Balances.

Spring balances	dis 50
Common 24 lb	₱ doz $1.50 dis 50

Bells.

Hand. light Brass	dis 75&10
Hand. Extra Heavy	dis65& 10 to 70
Hand. White Metal	dis70@70&10
Hand, Silver Chime	dis 25&10&5
Hand, Globe (Cone's Patent).	dis 25&10@35
Gong, Abbe's	dis 25&10@35
Gong, Yankee	dis 40&10
Gong, Barton's	dis 40&10@50
Pull, western	dis 25&10
Cow, common wrought	60&10
Cow, western	Sargent's List 70&10
Call	dis 40@40&5
Farm bells	₱ lb 2¾@3c
Steel alloy, church and school	dis 40

Bellows.

	Discount.
Blacksmith's	50&10 &5
Moulders,	discount 50@50 & 5
Hand,	discount 50@50 & 5

Belting, Rubber.

Standard	dis 70&5
Extra	
N. Y. Belting & Packing Co. standard	dis 70&5
N. Y. Belting & P'king extra standard	dis 60&5
Cleveland Rubber Co., extra standard	dis 60&10
Extra 5 dis on all for Cash.	
Shults Raw Hide Leather Belting, single,	dis 30
" " " " double,	dis 35
Standard, oak tanned,	dis 50
Lower grades	50&10 to 60

Bench Stops.

Hotchkiss's ₱ doz $5.00	dis 10@10&10
Weston's ₱ doz No. 1, $10.00; No. 2, $9	dis 25&10&5
McGill's	₱ doz $3.00 dis 10
Morrill's	₱ doz $9.00 dis 50

Bit Holders.

Extension, Barber's	₱ doz $15 00, dis 40&5
Diagonal	₱ doz $24.00 dis 40
Angular	₱ doz $24 00, dis 40&5

Blind Adjusters.

Domestic	₱ doz $3.00 dis 33⅓
Excelsior	₱ doz $10.00 dis 50 and 10 and 2

Blind Staples.

Barbed ¼ inch and larger	₱ lb 8@8½c net
Barbed ⅜ inch	₱ lb 9@9½c net

Bolts.

Cast iron barrel bolts	70@70&10
Cast Iron shutter bolts, etc	70@70&10
Cast iron chain bolts	65&10
Ives patent door bolts	55
Wr't iron barrel bolts	70@70&10
Wrought iron square bolts	70@70&10
Wrought shutter bolts	60&10
	Sargent's list
Carriage com. new list	70&15
Tire, common, new list	65&10
Carriage and tire, Philadelphia pattern	75&10@75 [&10&5
Stove bolts	65
Plow bolts	60&5
Machine	70@70&10
Rads	dis 70@70&10

Blind Fasteners.

Mackrell's	₱ doz. pairs, $1,00—dis 20@20&10
Van Sand's Screw Pattern	$15 ₱ gross—dis 60&10
Van Sand's Old Pattern	$15 ₱ gross—dis 55&10
Washburn's Old Pattern	$9.00 ₱ gross, net
Merriman's	new list, net
Salisbury & Austin No, 2008	$9.00 ₱ gross, net
Security Gravity	$9.00 ₱ gross, net

Borax.

₱ lb	6½

Boring Machines.

Without augers.	Upright	Angular
Douglas	5 50	6 75 dis 50
Snell's. Rice's patent	5 50	6 75 dis 40&10&10
Jennings	5 50	6 75 dis 45@45&10
Other machines	2 35	2 75 net
Phillips, with augers	7 00	7 50 net

Bow Pins.

Humason, Beckley & Co.'s, Nos. 1 and 2	dis 60 and 10@60 and 10 and 5
Humason, Beckley & Co.'s other Nos.	dis 70@70 and 10
Sargent & Co.'s	$17 and $18, dis 60 and 10
Peck, Stow & W. Co	dis 50 and 10@50 and 10 and 5

Braces.

Q. S. Backus	discount 60&5@60&10
Barber's	discount 50
Spoffard's Patent	discount 50&10
Common Ball. American	$1.00@$1.10
Bartholomew's Nos. 25, 27, 30	dis 50&10@60&5
Bartholomew's Nos. 117, 118, 119	dis 70@70&5
Amidon's Barker's imp'd	dis 60&10&5
Amidon's corner brace	dis 40@40&10
Universal	8 inch $1.90; 10 inch $2.10
Buffalo Ball	8 inch $1:10@$1. 15

Brackets.

Shelf, plain, Sargent's list	55&10@55&10&10
Fancy " "	dis 60&10@60&10&10
Reading, plain	dis 55&10@55&10&10
Reading, rosette	dis 60&10@60&10&10

Bright Wire Goods.

Regular List	75&10@75&10&5

Broilers.—Henis' self basting.

Inch	9	10	9x11
Per doz	$4 50	5 50	6 50

Buckets, Galvanized.

Hill's ₱ doz	12qt 4 25.....14qt 5 25
Iron clad 14 qt $4 25	

Bull Rings.

Union Nut Co	dis 55
Sargent's	dis 66⅔&10@70&5
Hotchkiss' low list	dis 30
Humason, Beckley & Co.'s	dis 70&10to70&10&10
Peck, Stow & W. Co.'s	dis 50&10to50&10&10
Ellrich Hardware Co., white metal low list	dis 50 ●50&10

Butts.

	Discount
Wrought brass	75&10@80
Cast brass, loose joint	33⅓&10to33⅓&10&10
Cast Iron—	
Fast joint, narrow	50&10&5
Fast joint, broad	55&10&5
Loose joint	66⅔&10&5
Loose joint, jap	66⅔&10&5
Loose joint, jap. with acorns	66⅔&10&5
Loose pin, acorns	66⅔&10&5
Loose pin. japanned acorns	66⅔&10&5
Loose pin.acorns.japanned, plated tips	66⅔&10&5
Wrougnt steel—	
Wrought, fast joint narrow	65&10&2
Wrought, fast joint broad	65&10&2
Wro't loose joint broad	65&10&2
Table Butts. back flaps, etc.	65&10&2
Regular inside blind	65&10&2
Light inside blind	65&10&2
Loose pin	65&10&2
Light loose pin	65&10&2

Can Openers.

Sprague No. 1 $2.00. 2 $2.25, 3 $2.50.	dis50&10&10
Universal	₱ doz $3 00. dis 35&5
Domestic	₱ doz $2 50, dis 45
Champion	₱ doz $2 00, dis 50

Caps—Percussion, ₱ 1000.

Hicks & Goldmark's	dis 35
F. L. Waterproof, 1-10's	50c
E. B. Trimmed Edge, 1-10's	65c
E. B. Ground Edge, Cent, Fire, 1-10's	70c
Double Waterproof, 1-10's	1.40
Musket Waterproof, 1-10's	54c
G. D.	28
Elys waterproof central-fire	$1.60

Cartridges.

Rim fire	discount 60&2
Pistol and rifle	discount 40&2
Military and sporting	discount 30&2

Carpet Stretchers.

Cast steel, polished	₱ doz $3.25
Cast iron, steel points	per doz50c
Sockets	₱ doz $1 75
Bullard's	dis25@25&10

Cattle Leaders.

Humason, Beckley & Co.'s	dis 75@75&10
Sargent's	dis 66⅔&10
Hotchkiss	dis 30
Peck, Stow & W. Co.	dis 50&10

Carpet Sweepers.

Queen	₱ doz $16.00
Mystic	₱ doz $16
Cottage	₱ doz $15
Queen, with band	₱ doz $18
King	₱ doz $30
Garland	₱ doz $18

Cards.

Horse and Curry	dis 10@10&10
Cotton	new list, Aug., 1883, dis 10
Wool	new list, Aug., 1883, dis 10

Casters.

Bed	dis 50&10@60&5
Plate	
Shallow Socket	
Deep Socket	dis 40&10
Yale Casters. list May, 1884.	dis 30 &10@40
Martin's patent	dis 45&10 to 50
Payson's Anti-friction	dis 60

Chains.

Trace, 6¼-10-2	₱ pair 1 05
Trace, 6¼-10-3	₱ pair 92c dis 50&5@60
Trace, 7-10-2	₱ pair 1.11
German Halter Chain, list June, 1884,	dis55&5@60
German Coil, list of June, 1881	dis55&5@60
Galvanized Pump Chain	₱ lb 5¼ to 5¾
Jack Chain, Iron	75&10@75&10&5
Jack Chain, Brass	dis75@75&10

Chalk.

White	₱ gross 55c
White Crayon	₱ gross 12@12½

Chisels.

Socket Framing. and Frmer	dis 75@ 75& 5
Socket Framing and Firmer. Buck, Bros.	dis 30
Socket Firmer & Framing, L. & I. J. White	dis 30@30 & 5
Tanged Firmers	dis 50 to 50&5

Clamps.

Snow's adjustable, iron	dis 40&5
Hammer's adjustable, iron	dis 15
Sargent's cabinet, iron	dis 66⅔&10

Clips.

Axle and spring bar, Norway iron	dis 55&5&5
Wrought-Iron felloe clips	₱ lb. 5½c
Steel felloe clips	₱ lb6c

Cockeyes.

discount	50

Cocks, Brass.

Hardware list	dis55&2

Coffee Mills.

Enterprise	20 & 10@30

Compasses, Dividers, &c.

Compasses	dis 70@70&10
Calipers	dis70@70&10
Dividers	dis 70@70&10
Bemis & Call Co.'s Dividers	dis 5)&5
Bemis & Call Co.'s Compasses & Calipers	dis 50&5
Bemis & Call Co,'s Wing & Inside or Outside	dis 50&5
Bemis & Call Co.'s Double	dis 60
Bemis & Call Co.'s (Call's Patent Inside)	dis 30
Excelsior	dis 50
Cook's Extension	dis25@25&10
J. Stevens & Co.'s Calipers and Dividers	dis 25&10

Coopers' Tools.

Bradley's	discount 20
Barton's	discount 20 to 20&5
L. & I. J. White	20 & 5

Corkscrews.

Humason, Beckley Mfg. Co	dis 40@40&10
Clough's patent	dis 33⅓@33⅓&5
Howe Bros. & Hulbert	dis 35

Corn Knives.

Corn knives, Bradleys	dis 10

Cradles.

Grain	dis 40&10@50

Crowbars.

Cast steel	₱ lb 4
Iron, steel points	3¼

Curry Combs.

Fitch's	dis 50&10@50&10&10
Rubber	₱ doz. $10.00, dis 25@30

Curtain Pins.

Silvered glass	net
White enamel	net

Cutlery.

Beaver Falls	dis 33⅓
Goodell table	dis35@ 40

Dog Collars.

Embossed gilt	dis 30&10
Leather	dis 40

Door Springs.

Torrey's Rod, regular size	₱ doz $1.30
Gem (Coil); list April 19, 1886,	dis 10

Drawing Knives.

Douglass & Witherby	dis75&10@75&10&5
Merrill	dis 60&10&10
L. & I. J. White	dis 20 & 5
Adjustable handle	dis 20 to25

Drills and Drill Stocks.

Blacksmiths' each	1.60@1.65
Blacksmiths' self-feeding, each	$7.50 discount 20
Breast, P. S. & W	discount 40 & 10
Breast, Millers Falls	each, $3.00 dis2 @25&10
Ratchet, Weston's	20@25
Automatic Boring Tools	each, $1.75 to $1.85
Twist drills	50&10
Morse	50&10
Syracuse	50&10
Standard	50&10
Cleveland	50&10
Williams	50&10&10

Drill Chucks.

Morse's Beach Patent	each, $8.00, discount 20
Morse's Adjustable	each. $7.00, dis 20 to 20&5

Dripping Pans.

Buffalo, S. S. & Co	₱ lb. 6 @ 6½c

Egg Beaters.

Dover	per doz. $2.50
Acme	per gross $7.00

Emery.

	No. 4 to 46 gr.	No. 54 to 150. gr.	Flour.CF F. FF.
Kegs, ₱ lb	4 c	4¼c	2¾c
½ kegs, ₱ lb	4¼c	4¾c	3 c
¼ kegs. ₱ lb	4½c	5 c	3½c
10 lb cans, 10 in case	6 c	6 c	5 c
10 lb cans, less than 10	10 c	10 c	7½c

Escutch on Pins.

Iron, List Nov. 11, 1885	dis 50&10@50&10&5
Brass	65@65&5

Escutcheons.

Door Lock	Same discounts as Door Locks
Brass Thread	dis 65 to 65 & 5
Wood	dis 25

Files.

J. & Riley Carr, new list April 1,1883,	dis 15
J. & Riley Carr horse rasps	dis 10
Best files of domestic make, according to brand	dis 60&10
Lower grade domestic files	dis 70@70&5
Heller's horse shoe rasp	dis 50&10

Faucets.

Frary's Patent Petroleum	dis 40 &10&2
Cork Lined	dis 70 to 70&10
Self-measuring, Enterprise, per doz $36	dis 20&10

Fly Traps.

Paragon	₱ doz $1.75

Forks

Hay, Manure and Spading, list	dis 65 5
Phila list	60@60&5

Fruit and Jelly Presses.

Enterprise Mfg. Co	dis 20&10@3

Fry Pans.

Central Stamping Co.'s list	dis 70

No	0	1	2	3	4	5	6	7	8
₱ doz.	$3 00	3 75	4 25	4 75	5 25	6 00	7 00	8 00	9 00

Fluting Scissors.

Discount	48

Fluting Machines

Eagle 3¼-inch	$2.15, dis 35
Geneva Hand Fluter. White Metal. ₱ doz. 12.00	dis 25
Shepard hand. Nos. 85 $15.30. 95 $8. 110 $11	dis 4
Knox, 4½ inch rolls	$3 25 each dis 35
Knox, 6 inch rolls	$3 60 each
Crown, 4½ in. $3 50; 6-in. $4 00; 8-in. $6 50 each	dis 35
Crown Jewel	6-in. $3 50 each, dis 35
American. 5-in. $3; 6-in. $3 40; 7-in. $4 50 each	dis 35
Crown hand fluter, Nos. 1 $15; 2, $12 50; 3, $10 ₱ doz	dis 50

Gauges.

Marking	dis 60&10
Wire	dis 10&10
Wire, Wheeler, Madden & Co	dis 10

Gimlets.

Nail and Spike	dis 50&10 & 5
"Eureka" Gimlets	dis 40&10
"Diamond" Gimlets	dis 40&10
Double Cut, Shepardson's	dis 50&10@60
Double Cut, Ives'	dis 40&10
Double Cut, Douglass'	dis 40&10
"Bee"	₱ gross $12. dis 25

Glue Pots.

Tin enameled	dis 40@40&5
Family, Howe's	dis 40

Grindstone Fixtures.

Sargent's	dis 70&10

Gun Wads.

U. M. C. & W. R. A.—B. E., 11up	2 00
U. M. C. & W. R. A.—B. E., 9&10	2 30
U. M. C. & W. R. A.—B. E., 7&8	2 60
U. M. C. & W. R. A.—P. E., 11up	3 10
U. M. C. & W. R. A.—P. E., 9&10	4 00
U. M. C. & W. R. A.—P. E., 7&8	4 90
	dis 20&2
Eley's B. E., 11 up	1 75
Eley's P. E., 11@20	2 80

Hack Saws.

Griffin's Hack Saws, complete	dis 40&10@50
Griffin's Hack Saw. Blades only	dis 40&10@50
Star Hack Saws and Blades	dis 25

Halters.

Covert s patent ¼ jute	dis 50&2
Covert's hemp horse and cattle ties	dis 50&2
Covert's jute horse and cattle ties	dis 60&10&2
Meneely's pat adjustable hemp and jute	dis 50&10
Meneely's hemp and jute horse and cattle ties	dis 50&10

Hammers.

Maydole s	discount 25@25&10
Cheney's new list, Jan 15, 1887	dis 40&10@40&10&10
Buffalo Hammer Co	dis 40&10@40&10&10
Magnetic Tack, No. 1, 2, 3, $1.25, $1.50 and $1.75,	dis 30&10
Heavy hammers and sledges under 5 lbs. 36c over 5lbs, 30 c	dis70@70&5

Hand Cuffs and Leg Irons.

Providence Tool Co., hand cuffs, $15 ₱ doz	dis 10
Providence Tool Co., leg irons $25 ₱ doz	dis 10
Tower's	dis 25
Daley's improved hand cuffs; 2 hands, polished, ₱ doz. $48; Nickeled, $57; 3 hands polished, ₱ doz $72; Nickeled, $84	dis 20

Handles—

Door or Thumb Latches.

Per doz Nos.	0	1	2	3	4	
Sargent's	90	1 00	1 18	1 35	1 50	dis 60&10 & 10

Roggin's Latches	₱ doz. 30@35c
Bronze Iron Drop Latches	₱ doz. 70c net
Jap'd store door handles—Nuts. $1 62; Plate $1 10; no plate $0 88	net
Barn door	₱ doz $1 40, dis 10&10
Wrought chest	dis 70
Surface chest	dis 70
Flush chest	dis 70
Lifting	dis 70
Saw and plane	dis 40&10@40&10&5
Hammer and hatchet	dis 25&5&2
Brad awl	₱ gross $2 0
Hickory firmer chisel, assort	₱ gross $4 50
Hickory firmer chisel, large	₱ gross $5 00
Apple firmer chisel, assorted	₱ gros $5 00
Apple firmer chisel, large	₱ gross $6 00
Socket firmer chisel, assorted	₱ gross $3 00
Socket framing chisel, assort	₱ gross $5 00
	dis 40
File. assorted	₱ gross $2 75
Auger, assorted	₱ gross $5 00
Auger, large	₱ gross $7 00
	dis 40 @40&10

Hangers.

Barn Door. old patterns	dis 60&10 &10@70
Barn Door. New England	dis 60&10&10@70
Climax (Anti-Friction)	dis 55
Zenith Anti-Friction Wood Track	dis 55
Reed's Steel Arm	dis 40
Challenge	dis 50
"Champion" Medina Mfg. Co	dis 60 &10
Sterling Improved (Anti-friction)	dis 65&10
Victor, No. 1, $15; No.2, $16.50; No. 3. $18.	dis50&2
Cherritree	dis 50 & 5
Kidder's	dis 50&10@60
U. S., wood track	dis 65
The "Boss"	dis 60
Terry's Patent.5 in.. 12.00; 3½ in., 10.00,	dis 50 ● 50&5
Cronk No. 4, 12.00; No. 5, 14.40; No. 6, 18.00,	dis 50&10@50&15
Architect	₱ set 6.00, dis 2
Eclipse	dis 20&10
Felix	₱ set 4.50, dis 20
Hamilton Wrought	dis58

Harness Snaps

German, new list	dis 40&10
Covert, New Patent, new list	dis 50&5&2

Hay Knives.

Lightning	per doz. $18 dis 30
Electric	₱ doz $17.00 dis 30

Hinges.

Wrought Strap and T Hinges	6½&10&2@70&5
Screw, hook and strap, 8 10 12 in	3½@4
to 36 in	2¾@3
Screw hook & eye hinges, ½	₱ doz 1.50
⅝	2.45
¾	3.80
	dis 10
Gate, western	₱ doz $4 40, dis 55
Gate, N. E.	₱ doz $7 00, dis 55
Gate, N. E. reversible	₱ doz $5 20, dis 55&10
Gate. Clark's. Nos. 1. 2. 3	dis60&10@60&10&5
Gate. N. Y. State	₱ doz $5 00, dis 55&10
Gate, automatic	₱ doz $12 50, dis 50
Gate, common sense	₱ doz pair $4 50, dis 50
Gate, Seymour's	dis 45&10

Hollow-Ware.

Stove Hollow-Ware. Ground	dis 60&10@60&10&5
Enameled and Tinned Hollow-Ware Kettles.	dis 60&10
Oval Boilers, Saucepans	dis 40@40&5
Gray Enameled Ware	dis40@40&5
Rustless Hollow-Ware	dis 50@50&5
Galvanized Tea-Kettles	

Inch	6	7	8	9
Each	55	60	65	75

Hoes.

Garden, mortar	dis 65&5
Planter's, cot	dis 65&5
Magic	₱ doz $4.75
Grub	dis 60@60&10

Hog Rings and Ringers.

Perfect rings	₱ doz boxes $1.75@$2
Perfect ringers	₱ doz $2.50
Blair hog ringers	₱ doz $2.60

Hoisting Apparatus.

"Moore's" hand hoist, with lock brake	dis 15
"Moore's differential pulley block	dis 20

Hooks.

Bird Cage, Sargent's list	dis 60&10&10
Belt	dis 75&10@80
Clothes Line Sargent's list	di 60&10
Ceiling Sargent's list	dis 55&10
Coat and Hat. Sargent's list	dis 55&10
Wire Coat and Hat. Gem	dis 45
Wrought Staples and Hooks & Staples. list Jan 12, 1887	dis62½20@80&20&10
Wire Screw Hooks and Screw Eyes.	dis 75&10
Hooks and Eyes—Malleable Iron	dis 70

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A 6"x10" SELF-INKING Foot Power Printing Press; will do good work. Address J. M., care Iron Trade Review, Cleveland, O. tf

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ONE OF DUNN'S HOISTING MACHINES, with over 40 feet of chain. Good as new; capacity, 600 lbs. Address Dunn, care Iron Trade Review, Cleveland, O. tf

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A GOOD Charcoal Iron Furnace, in Michigan. For particulars address E. C. Pope, 31 and 32 Wilshire Building, Cleveland, O. tf

For Sale.

WOODRUFF & BEACH, Hartford, Conn., Automatic Engine. 24x48; Buckeye Automatic Engine, 18x36; John Cooper & Co. Automatic Engine. 20x36; 1 Circular Mill, 68" Saw, Engine, and Boiler, direct connected, $600; 2 Sturtevant Boston Blowers, large size.

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One 12"x18" new Automatic Engine.
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One 8x14 new Slide Valve Engine.
One new Portable Farm Engine.
One second-hand Farm Engine, in good repair.
One Direct-Action Circular Saw Mill, second-hand, in good repair.

All of above our own manufacture. Will be sold cheap for cash. Write for prices and description, to

THOS. SHARP & CO.,
52-3m Salem, Ohio.

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1 Fay & Co. Little Giant 4-roll single cylinder Planer and Matcher.
1 Fay & Co. Little Giant 4-roll double cylinder Planer and Matcher.
1 Tompkins 6-roll 24-inch double cylinder Planer and Matcher.
1 Ball 24-inch single cylinder Planer and Matcher.
1 Fay & Co. endless bed, single surface Planer, 24 inches wide, 8 inches thick.
1 Fay & Co. endless bed, single surface Planer, 26 inches wide, 6 inches thick.
1 20-inch Pony Planer, made by Frank & Co.
2 Panel Raisers.
1 Ball wood frame Sash machine.
1 self-feed blind Slat Tenoner.
1 Goodspeed & Wyman Gauge Lathe.
1 Rogers' Axe-handle Lathe.
1 Union Siding machine. This machine planes both sides, joints both edges, and Resaws at one operation.
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1 Bolt Equalizer.
Lot Second-hand Stave Machinery.
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1 Hand Stamping Machine, } For making Cigs Boxes.
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A GOOD CHARCHOAL IRON FURNACE in Michigan. For particulars inquire of E. C. POPE,
11 and 12 Wade Building,
82-3t Cleveland, O.

Wanted to Buy.

A 20 or 24" Power Wood Planer. Address with price and full particulars "K," care Iron Trade Review, Cleveland, O. tf

Wanted.

A GOOD BUSINESS MAN with capital, to take interest in a manufacturing iron business. 100 per cent. profit. Address J. G. J., care Iron Trade Review. tf

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The undersigned will sell their Real Estate Machine Shop, Machinery, Tools, etc., to the highest bidder, at Public Sale, on Tuesday, Sept. 20th, at 2 P. M. Terms Cash.

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Warren, O. Aug. 30 1887. 3t

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¼ and 3⅛ to 4 inches	11
7-32 and 4⅛ to 5 inches	12
3-16 and 5⅛ to 6 "	14½
5-32 "	18½
⅛ "	25½
Oil well steel forgings	18½

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	Crucible Best.	2d. Qual.	3d. Qual.	Bessemer & open-h'rth.
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Skate Steel	4½
Mattock, beveled	3
Table cutlery	3½
Table Cutlery, beveled	4
Trap spring steel	6
Pike and cant hook	7
Coal and granite wedge	7
Roller	5½
Spindle, subject to machinery classification	5½
Trap spring steel	6
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	¼	42	0 04	0 05	.088
	⅜	56	0 04	0 05½	.091
	½	84	0 05	0 07	.109
	¾	1 12	0 07	0 09	.113
	1	1 67	0 09½	0 12½	.134
	1¼	2 24	0 12½	0 17	.140
Lap Welded.	1½	2 68	0 22	0 25	.145
	2	3 61	0 28	0 32	.154
	2½	5 74	0 44	0 49	.204
	3	7 54	0 58	0 64	.217
	3½	9 00	0 70	0 86	.226
	4	10 66	0 85	1 00	.237
	4½	12 24	1 00	1 25	.246
	5	14 50	1 20	1 50	.259
	6	18 76	1 65	2 00	.280
	7	23 27	2 00		.301
	8	28 18	2 75		.322
	9	33 70	3 70		.344
	10	40 06	4 75		.366
	11	45 02	5 75		.375
	12	49 00	6 50		.375
	13	54 00	7 75		.375
	14	58 00	9 00		.375
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Tuscarawas	2 00@2 25
New Haselton	2 00
New Haselton, mix	1 15@1 20
" nut	1 75@1 85
Connotton	2 00@2 25
Connotton, mix	1 20
" nut	1 75@1 85
Anthracite grate	5 04
Anthracite egg	5 04
Anthracite stove	5 27
Anthracite chestnut	5 27

RETAIL.—Delivered.

Massillon Lump	3 65
" Nut	3 40
Carbon Hill and Monday Creek, lump	3 50
Carbon Hill and Monday Creek, nut	3 25
Straitsville, lump	3 40
Straitsville, nut	3 15
Palmyra Lump	3 75@4 00
New Haselton Lump	2 75
New Haselton Nut	2 50
Osnaburg Lump	2 75
Osnaburg Nut	2 50

75c less on cars by car load.

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Pure Oils. Packages included.

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Straits	37@40
Bank	35@38
Lard oil, extra W. S	53@58
do No. 1 do	45@48
do No. 2 do	40@43
Tallow oil	60@65
Neatsfoot oil, pure	90@1 00
do No. 1	65@75
Linseed oil, raw	46@49
do do boiled	49@52
Cotton seed oil, white	47@50
do do yellow	48@53
West Virginia lubricating 28 deg	10c@15c
Paraffine oil, winter pressed	15@18
Capitol Cylinder	35
Model do	30
Eldorado Engine	23
Turpentine, per gal	38
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No. 1, Buffalo, New York, and all New England points	10 15 a.m
No. 3, Chicago, Cincinnati, St. Louis	1 10 p.m
No. 9, Buffalo Express	3 40 p.m
No. 51, Beaver Falls Accommodation	5 20 p.m
No. 11, Buffalo Express	10 30 p.m

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No. 50, Beaver Falls Accommodation	5 25 a.m
No. 8, Buffalo and Cleveland Night Exp.	7 00 a.m
No. 2, Youngstown Accommodation	9 20 a.m
No 52 Beaver Falls Accommodation	1 00 p.m
No. 12, Chicago, Cincinnati & St. Louis	1 35p.m
No. 6, Buffalo Express	5 45 p.m
No. 4, Cincin., St. Louis and Cleveland	8 05p.m
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Chicago Passenger	9 10 p m	.....
Local Freight	4 40 p m	5 45 a m
WESTWARD.	ARRIVE.	DEPART.
Chicago Passenger	.....	6 30 a m
Fostoria Passenger	4 46 p m	4 51 p m
Local Freight	5 20 p m	5 50 a m

Rocky River Accommodation departs 7:40 a. m.; 1:35 p. m.

Euclid Accommodation departs 6:24 a. m., 9:10 a. m., 5:15 p. m.

All trains daily, except Sunday.

Cleveland & Pittsburg.

	ARRIVE.	DEPART.
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New York Express	6 30 p m	12 10 p m
Alliance Accommodation	9 35 a m	4 15 p m
Ravenna Accommodation	8 25 a m	5 00 p m
Night Express	* 5 25 a m	*11 10 p m
Bedford Accommodation	3 17 p m	1 40 p m

Train leaving at 12:10 p. m. has Pullman Buffet Sleeper from Cleveland to New York, arriving in New York at 7:30 next morning.

*Daily; all other trains daily except Sunday.

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C., A. & C. Ry. Co.	ARRIVE.	DEPART.
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Akron, Col. & Cin. Night Express	6 45 a m	8 00 p m
Akron & Columbus Exp	12 55 p m	12 10 p m
Akron & Orrville Accom	9 35 a m	4 15 p m

The 8 p. m. train runs daily. Elegant Pullman palace sleeping cars attached. All other trains daily except Sunday.

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Fast N. Y. & Pitts. Express	*10 55 a m	*3 00 p m
Mahoning Accommodation		†6 40 a m
Pittsburgh Express	† 6 25 p m	
Youngstown Local	†8 05 a m	
Mahoning div. and Pitts Local		*11 40 a m
Mahoning Val Accom		*4 30 p m
Pittsburgn Express	†1 20 p m	11 10 p m
New York Express	*8 00 p m	

* Daily. † Daily except Sunday. ‡ Daily except Monday.

Lake Shore & Michigan Southern Railroad.

TRAINS GOING EAST.	Arrive from West.	Depart East.
No. 4, Fast Limited Ex	2 55 a m	*2 55 a m
No. 8, N. Y., B'f'n & At. Ex	*8 30 a m	*8 55 a m
No. 26, Elyria Accom	†7 45 a m	.....
No. 24, Toledo & Buffalo Accom. via Sandusky	†10 05 a m	†10 15 a m
No. 24, Buffalo Accom	†10 05 a m	†10 15 a m
No. 10, N. Y. & Boston "Flyer,"		*11 35 a m
No. 12, N. Y. & Bos. Ex.	*2 20 p m	*2 45 p m
No. 2, Night Express	†9 40 p m	†10 00 p m
No 26, Conneaut Accom	.....	†4 25 p m
TRAINS GOING WEST.	Arrive from East.	Depart West.
No. 1, Fast Limited Ex	*12 15 a m	*12 15 a m
No. 23, Cleveland Express	*2 15 a m	
No. 3, Chi. Ex. via Sand'y	15 20 a m	†5 35 a m
No. 25, Mich. Ac. via Norw'k	.....	†5 35 a m
No. 21, Toledo Ex. via Norwalk and Sandusky	†12 50 p m	†3 20 p m
No. 5, Fast St. Louis & Chicago Ex. via Sandusky	*10 50 a m	*10 55 a m
No. 9, Chi. Pac. Ex. via Nor'k	*6 15 p m	*6 40 p m
No. 31, Elyria Accommodation, to Elyria only	.....	†4 30 p m
No. 27, Conneaut Accom	†8 10 a m	.....

Sunday train for Nottingham—Depart 8:15 a. m. and 1:45 p. m.; returning, leave Nottingham at 8:50 a. m. and 3:45 p. m.

Reference marks—*Daily. †Daily except Sunday. .Daily except Monday.

A local Cleveland and New York Sleeper and dining car daily on No. 10, leaving Cleveland at 11:35 a. m., arrives Grand Central Depot, New York 7:30 a. m.

For further information as to trains and connections apply at the Union Ticket Office, corner Bank & Superior-sts., under Mercantile Bank.

M. E. GAUL, City Pass. Ag't. A. J. SMITH, Gen'l Pass. & Ticket Ag't.

Cleveland and Canton Railroad.

Arrive.—Canton, Sherrodsville and Coshocton 9 55 a.m., 7 00 p.m.

Kent —*7 50 a.m., *7 16 p.m.

Bedford—*7:50 a.m., 1:05 p.m., 7 16 p.m.

Newburgh and Miles avenue—7:10 a.m., 4:15, p.m. 5:33 p.m.

Depart—

Canton, Sher'dsville & Cosh't'n—7:00 a.m. and 3:10 p.m.

Kent—*8:38 a.m. and *8:30 p.m.

Bedford—*8:38 a.m., 4:45 p.m., 11:10 a.m., 5:45 p.m.

Newburgh and Miles Avenue—6:12 a.m., 2:00 p.m., 4:40 p.m.

Trains marked with * run daily. All others daily except Sunday.

Depot at Ontario street, opposit Huron street

Valley Railway.

	ARRIVE.
From Akron	8 20 a m
From Canton	10 30 a m
From Akron	3 05 p m
From Valley Junction	6 00 p m
	DEPART.
For Valley Junc. and interme. points	7 50 a m
For Valley Junc. and interme. points	12 20 p m
For Canton and intermediate points	4 00 p m
For Akron	7 45 p m

Trains leave depot, South Water Street.

Cleveland, Lorain and Wheeling.

	DEPART.	ARRIVE.
Wheeling Express	6 45 a m	6 55 p m
Ubrichsville Express	4 00 p m	9 20 a m

J. E. Scott, Mfgr. of **Awnings & Tents** of every description.

Water-proof Horse Clothing, &c.
10 and 12 Woodward Ave., [92-1y] DETROIT, MICH.

WHEELING & LAKE ERIE

TIME TABLE—IN EFFECT SEPT. 4, 1887.

Central Standard Time.

EASTWARD.	No. 5.	No. 7.	No. 9.*	No. 1.*
Toledo.....lv	7 45 AM	1 00 PM	4 50 PM	.....
Oak Harbor...ar	8 41	1 53	5 45	.....
Fremont	9 07	2 18	6 08	.....
Clyde	9 24	2 35	6 23	.....
Bellevue	9 40	2 48	6 37	.....
Monroeville...lv	9 58	3 05	7 01	3 10 AM
Norwalk	10 15	3 22	7 17	3 22
Wellington	11 05	4 13	8 08	4 03
Creston.....ar	11 53	5 05	8 55 PM	4 47
Orrville.....ar	12 20 PM	5 35	5 15 AM	5 15*
Orrville.....lv	12 40	5 40	7 00	7 00
Massillon.....ar	1 20	6 20	7 42	7 42
Massillon.....lv	1 20	6 20	7 42	7 42
Navarre	1 35	6 35	8 00	8 00
Valley Junc.lv.	2 15	7 20	8 45	8 45
New Cumberl'd	2 28	7 33	9 05	9 05
Sherrodsville	2 40	7 45	9 25	9 25
Leesville	2 48	7 53	9 40	9 40
Bowerston....ar	2 55 PM	8 00 PM	9 50 AM	9 50 AM
Canal Dover	3 42 PM	7 30 PM	.....	.....
New Comerst'n	4 28	6 30 AM	.....	.....
Cambridge	5 25	7 30	.....	.....
Macksburg	6 56	9 08	.....	.....
Marietta.....ar	8 10 PM	10 15 AM	.....	.....

WESTWARD.	No. 6.	No. 8.	No. 4.	No. 2.*
Marietta.....lv	6 50 AM	12 15 PM	.....	.....
Macksburg	8 04	1 26	.....	.....
Cambridge	9 40	3 00	.....	.....
New Comerst'n	10 50	4 00	.....	.....
Canal Dover	11 32 AM	4 40 PM	.....	.....
Bowerston	11 25 AM	3 45 PM	6 35 AM	.....
Leesville	11 32	3 55	6 43	.....
Sherrodsville	11 40	4 10	6 53	.....
New Cumberl'd	11 52	4 25	7 07	.....
Valley Junc	12 20 PM	5 02	7 25	.....
Navarre	12 50	5 33	8 00	.....
Massillon	1 05	5 50	8 15	.....
Orrville.....ar	1 40	6 25	8 53	.....
Orrville.....lv	1 45	6 35*	8 58	*
Creston.....lv	2 18	7 02	9 28	5 30 AM
Wellington	3 05	7 43	10 15	6 20
Norwalk	3 55	8 25	11 25	7 25
Monroeville	4 07	8 35	11 37	7 35
Bellevue	4 23	9 15	11 55	7 51
Clyde	4 39	9 29	12 10 PM	8 06
Fremont	4 55	9 45	12 28	8 23
Oak Harbor	5 20	.....	12 53	8 45
Toledo.....ar	6 15 PM	10 45*	1 50 PM	9 40 AM

No. 27	No. 25	Huron Divis'n.	No. 26	No. 24
.....	9 30 AM	Ar. Huron ..Lv	1 15 PM	.....
.....	9 12	Friese Landing	1 30	.....
4 20	9 00	.....Milan	1 45	6 55
Lv 4 00	Lv 8 35	.....Norwalk.....	Ar 2 10	Ar 7 15
Ar 3 25	Ar 8 35		Lv 2 10	Lv 7 30
2 40 PM	8 15 AM	...Monroeville..	2 30 PM	8 10 AM

* Daily.

No. 23 leaves Norwalk 6:05 a. m. arrives Milan 6:30 a. m. No. 24 leaves Milan 6:45 a. m., arrives Norwalk 7:05 a. m.

This road is now open through from Toledo to Bowerston, connecting with the Pennsylvania System for all points East.

THROUGH CAR SERVICE.

Between Toledo, Cambridge and Marietta.
" " and Bowerston.
" " and Akron, Youngstown and Pittsburgh.
" Chicago, Akron, Youngstown and Pittsburgh.

M. D. WOODFORD, General Manager. JAMES M. HALL, Gen'l Pass. Agt.

Scioto Valley Railway

TIME TABLE.

In effect Aug. 8, 1886.

THE SHORT LINE TO ALL POINTS

North and South, East and Southeast, West and Northwest.

TRAINS GOING SOUTH

STATIONS.	No. 2.	No. 4.	No. 6.
Columbus.....Lv	7 00 a.m	11 25 a.m	5 30 p.m
Valley Crossing	7 22 "	11 47 "	5 52 "
Lockbourne	7 34 "	11 58 "	6 04 "
Ashville	7 50 "	12 12 p.m	6 20 "
Circleville	8 12 "	12 34 "	6 42 "
Kingston	8 34 "	12 54 "	7 04 "
Chillicothe	9 01 "	1 35 "	7 50 "
Sharon	9 40 "	2 11 "	8 30 "
Waverly	9 50 "	2 20 "	8 38 "
Piketon	10 02 "	2 34 "	8 52 "
Big Run	10 18 "	2 50 "	9 08 "
Lucasville	10 36 "	3 09 "	9 25 "
Portsmouth	11 00 "	3 35 "	9 50 "
Sciotoville	11 16 "	3 51 "	10 06 "
Wheelersburg	11 22 "	3 57 "	10 12 "
Haverhill	11 43 "	4 18 "	10 33 "
Hanging Rock	11 54 "	4 29 "	10 44 "
Ironton	12 04 p.m	4 39 "	10 54 "
Petersburg	12 15 "	4 50 "	11 05 "
Ashland.....Ar	12 45 p.m	5 20 p.m	11 35 p.m

Trains Nos. 2 and 4 daily, except Sunday.
Train No. 6 daily.
Train No. 6 takes supper at Chillicothe.

TRAINS GOING NORTH.

STATIONS.	No. 1.	No. 3.	No. 5.
Ashland.....Lv	2 46 a.m	8 47 a.m	5 25 p.m
Petersburg	3 15 "	9 17 "	5 55 "
Ironton	3 26 "	9 28 "	6 06 "
Hanging Rock	3 36 "	9 38 "	6 16 "
Haverhill	3 46 "	9 49 "	6 27 "
Wheelersburg	4 06 "	10 10 "	6 48 "
Sciotoville	4 12 "	10 16 "	6 54 "
Portsmouth	4 27 "	10 32 "	7 10 "
Lucasville	4 49 "	10 56 "	7 35 "
Big Run	5 40 "	11 14 "	7 52 "
Piketon	5 18 "	11 30 "	8 08 "
Waverly	5 30 "	11 43 "	8 21 "
Sharon	5 40 "	11 53 "	8 30 "
Chillicothe	6 35 "	12 55 p.m	9 20 "
Kingston	7 03 "	1 26 "	9 46 "
Circleville	7 20 "	1 48 "	10 07 "
Ashville	7 50 "	2 10 "	10 29 "
Lockbourne	8 06 "	2 26 "	10 43 "
Valley Crossing	8 18 "	2 38 "	10 55 "
Columbus.....Ar	8 40 a.m	3 00 p.m	11 17 p.m

Train No. 1 daily.
Trains Nos. 3 and 5 daily, except Sunday.

COUPON TICKETS, by the best routes and to all principal points in the United States and Canada, can be found at the following Stations: Columbus, Circleville, Kingston, Chillicothe Waverly, Portsmouth, Ironton, A. C. & I. Ashland.

For further information relative to rates, connections and through time, call on your Ticket Agent, or address J. ROBINSON, Receiver.

JNO. J. ANCHER, Gen'l Pass. & Ticket Ag't, Columbus, Ohio.

Ft. Wayne, Cincinnati & Louisville RAILROAD.

THE POPULAR ROUTE

BETWEEN THE

NORTH and SOUTH

THE DIRECT ROUTE TO OR FROM FORT WAYNE, INDIANAPOLIS, TERRE HAUTE, EVANSVILLE, AND ST. LOUIS.

13 MILES SHORTER —BETWEEN— **13**

Fort Wayne and Indianapolis

Than any other Route.

22 MILES SHORTER AND QUICKER **22**

By 3 HOURS, Between

Louisville and Fort Wayne.

No change of Cars

—BETWEEN—

Cincinnati and Fort Wayne,

Via White Water Railroad.

All trains arrive and depart from Central Union Passenger Station Cincinnati, Corner Third Street and Central Avenue.

DIRECT CONNECTION

At Fort Wayne with L. S. & M. S. Trains for all points North and East.

Ask for Tickets

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Ft. Wayne, Cincinnati & Louisville Railroad.

For sale by all Agents of connecting lines, EAST, WEST, NORTH AND SOUTH.

W. W. WORTHINGTON, Gen'l Supt. ROBT. F. KINNAIRD, Gen'l Ticket Agent, FORT WAYNE, IND.

New York, Lake Erie & Western R. R.

COMMENCING

July 1, 1887

—THE NEW—

Lake Erie & Western R. R.,

Lessee New York, Penn. & Ohio R. R.,

—WILL PLACE ON SALE—

THOUSAND MILE TICKETS

good one year from date of issue, at the rate of

$20.00.

These tickets will be accepted for passage not only on all divisions of the N. Y. P. & O. R. R., but also over the entire "Erie" system, in like manner. Mileage tickets issued by the "Erie" will be accepted over the N. Y., P. & O. R. R. Their use will not be confined to one person only, but when issued to the head of a family, will be good for any members thereof, or for the entire family when traveling together; and when issued to business houses or firms, they can be used by any one member or representative thereof traveling at their expense, but only by one person at a time.

All mileage books purchased previous to July 1st will be accepted for passage over the entire "Erie" system.

The Picturesque Lehigh Valley Route.

Three through trains with Pullman cars attached are now run via by this beautiful scenic route, between Suspension Bridge, Buffalo, New York and Philadelphia, leaving Suspension Bridge 8:18 A. M. 4:10 and 7:45 P. M., Buffalo 9:00 A. M. and 4:40 and 10:00 P. M., connecting with all trains from the West.

Passengers between the East and West passing over the famed LEHIGH VALLEY ROAD will experience the pleasure of a trip through the most magnificent and picturesque scenery in the world, presenting an ever varying panorama of delightful surprises.

Double track, steel rails, magnificent road bed and unrivaled equipment, all combine to make the LEHIGH VALLEY the favorite and most desirable route between the East and the West.

Anthracite Coal is used entirely, guaranteeing to passengers perfect freedom from the dense volumes of smoke that so greatly annoy passengers on lines using Bituminous Coal.

E. B. BYINGTON, Gen'l Pass. Agent, Mauch Chunk, Pa

New York, Penn. and Ohio Railroad

N. Y., L. E. & W. R. R. CO. LESSEES.

New York, Boston and the East.

THE SHORTEST AND QUICKEST ROUTE TO PITTSBURGH, WASHINGTON AND BALTIMORE, AND THE SOUTHEAST.

Change of time goes into effect May 22, 1887.

Central, or Ninetieth Meridian time, 33 minutes slower than Cleveland city time.

Until further notice trains will leave from the New Central Depot, South Water Street and Viaduct, as follows:

	Depart.
No. 62, Mahoning Valley Accomm	† 6 40 a m
No. 72, New York Express	* 8 25 a m
No. 72, Fast Pittsburgh Express	* 8 25 a m
No. 64, Fast New York Express	* 3 00 p m
No. 64, Pittsburgh Express	* 3 00 p m
No. 66, Mahoning Valley Accomm	* 4 30 p m
No. 66, Pittsburgh Local	† 4 30 p m
No. 68, Pittsburgh Express	†11 10 p m
No. 68, New York Express	†11 10 p m
No. 70, Pittsburgh Local Express	*11 40 a m
	Arrive.
No. 61, New York Express	† 5 38 a m
No. 61, Pittsburgh Express	† 5 38 a m
No. 65, Fast New York Express	*10 55 a m
No. 65, Pittsburgh Express	*10 55 a m
No. 67, Pittsburgh Express	† 1 20 p m
No. 63, New York Express	* 8 00 p m
No. 69, Pittsburgh Express	* 6 25 p m
No. 77, Youngstown Local	* 8 05 a m
No. 13, Erie Express, carrying express matter only, from all points East and South-east, carries no passengers (except Monday)	† 1 20 p m

* Daily .† Daily, except Sunday.

This is the only route by which passengers can reach Corry, Elmira, Binghampton, New York City and intermediate points without change. One change to Boston and New England cities.

Baggage checked through to all points East.

Through tickets and information regarding the route can be obtained at office, 141 Superior street, and at Depot N. Y., P. & O. Railroad, South Water street and Viaduct, Cleveland. Ship by Erie Express.

L. P. FARMER, Gen'l Pass. Agent, New York.
A. E. CLARK, Ass't Gen'l Pass. Agent, Cleveland, O.
J. R. SHALER, General Superintendent, Cleveland, O.
M. L. FOUTS, Passenger Agent. 141 Superior Street, Weddell House, Cleveland, O.

Cleveland & Marietta R. R.

New Through Line Between the Ohio River and the Great Lakes.

The popular line to Chicago, St. Paul, Milwaukee, Minneapolis, and all points in the Great Northwest. Direct connection for the Pennsylvania Oil Fields and all points East and Southeast. December 5, 1886.

GOING NORTH.			GOING SOUTH.	
No. 2.	No. 4.	STATIONS.	No. 3.	No. 1.
6 50 AM	12 15 PM	lv..Marietta..ar	8 10 PM	10 15 AM
7 32	12 55	.....Whipple.....	7 24	9 34
7 42	1 05	.....Warner.....	7 19	9 24
7 55	1 18	.....Elba.....	7 04	9 11
8 04	1 26	...Macksburg...	6 56	9 03
8 13	1 34	...Dexter City...	6 48	8 55
8 35	1 55	.....Caldwell.....	6 26	8 30
8 45	2 05	...Belle Valley...	6 16	8 21
9 08	2 27	...Pt. Pleasant...	5 52	7 58
9 20	2 40	.....Byesville.....	5 40	7 45
9 40	2 55	.....Cambridge.....	5 25	7 30
10 05	3 25	...Kimbolton ...	4 58	7 03
10 40	4 00	N. Comerstown	4 28	6 30
11 12 AM	4 22 PM	..Phillipsburg..	4 02	6 10
11 32	4 40	...Canal Dover..	3 42	5 52
11 50	5 00	.. Valley Junc...	3 20	5 30
12 52 PM	8 13 AM	.....Canton.....	2 28	8 02 PM
1 49	9 10	..... Akron.....	1 32	7 05
3 00	10 30	... Cleveland....	12 20	5 45
1 23	5 33 PM	....Massillon ...	1 23 PM	5 45
2 40	7 02	.....Creston.....	11 52	4 38
4 10	8 25	.....Norwalk.....	10 13	2 55
6 35	.....	.....Toledo.....	7 45	12 36
12 05	4 55	....Coshocton...	1 50 PM	.....
2 05	5 55	....Zanesville ...	11 50 AM	.....
1 25	6 10	.....Newark.	12 45 PM	.....
2 20	7 10	.....Columbus....	11 45 AM	.....
6 20	.....	... Cincinnati ...	7 45 AM	.....
.....	7 05	.....Chicago.....	8 30 PM	.....
1 42	A. M.	...Steubenville..	1 52	12 47 PM
3 20	.....	....Pittsburgh...	12 05	11 15 AM

	No. 8.
Leave.....Marietta	3 00 PM
.....Whipple	3 55
.....Warner	4 10
.....Elba	4 28
.....Macksburg	4 42
.....Dexter City	4 54
.....Caldwell	5 30
.....Belle Valley	5 45
.....Point Pleasant	6 26
.....Byesville	6 43
.....Cambridge	7 00

Through coaches on trains Nos. 2 and 3, between Marietta, Toledo and Cleveland.

Church train leaves Cambridge, Sunday only, at 7:30 a. m., and arrives at Mariett at 10:10 a. m.; returning leaves Marietta at 2:00 p. m., arriving at Cambridge at 4:40 p. m.

A. T. WIKOFF, President. F. G. JEWETT, Gen. Pass. Agt.

Iron Clad Paint Co.

factory 75 & 77 Central Way. Sec. & Treas. No. 3 Case Building.

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Trade Mark Patented—Paint Patented

Order direct from the **Iron Clad Paint Co.,**

And get the genuine article, and save liability of suit for using an article made in violation of the patents issued to Wm. Green and now owned by this Company.

IRON CLAD PAINT is the most durable, most fireproof and Cheapest Paint made.

FURNISHED both Dry and Ground in Oil.

Used by Nearly all the Railroads. 63

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Patent Burglar Proof Door Locks,

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Large Catalogue mailed on receipt of 50 cents. A condensed Catalogue mailed free. 11

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No Explosions From Natural Gas.

No Valve Wedge or Spring to stick. All valves thoroughly tested and warranted.

ALSO AGENT FOR

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The best burner for natural or artificial gas on the market.

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WOOD-WORKING MACHINERY

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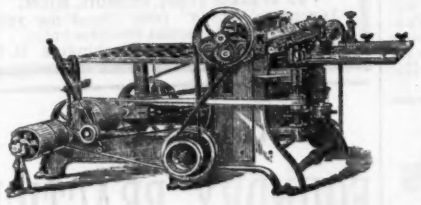

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Railroad Shops,

CAR BUILDERS,

Carriage, Sash, Door, Blind and Cabinet Makers.

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SEND FOR DESCRIPTIVE PAMPHLET

Stump before a blast. | Fragments after a blast.

STRONGEST and SAFEST EXPLOSIVE Known to the Arts.

POWDER, FUSE, CAPS, Electric Mining Goods,

AND ALL TOOLS FOR STUMP BLASTING, FOR SALE BY THE

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J. W. WILLARD, Manager.

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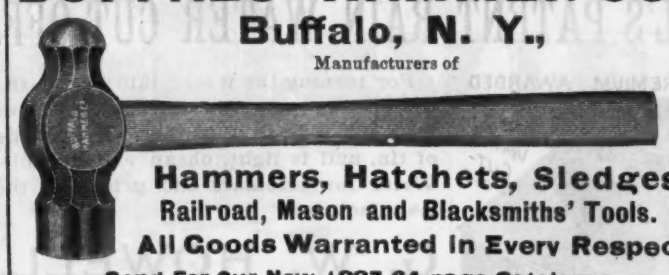
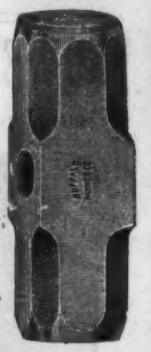
BUFFALO HAMMER CO.,

Buffalo, N. Y.,

Manufacturers of





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Railroad, Mason and Blacksmiths' Tools.

All Goods Warranted in Every Respect.

Send For Our New 1887 64-page Catalogue.

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—MADE BY—

Harmon, Gibbs & Co.

CORRY, PA.

Cleveland Foundry.

Castings

For Machinery and Rolling Mills

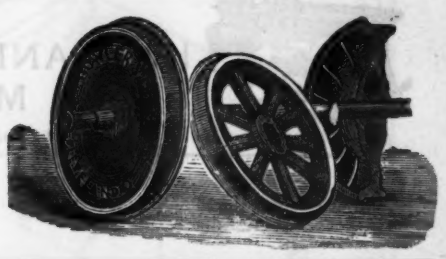
Car Wheels

all sizes and kinds, with and without Axles.

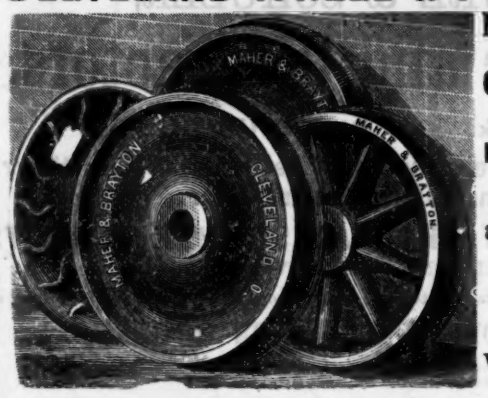
Chilled Faced R. R. Frogs

STREET RAILROAD TURNOUTS.

Nos 9, 11 & 13 Winter Street. } **Bowler & Co**



CLEVELAND WHEEL & FOUNDRY WORKS.



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Manufacturers of

Car, Engine, Truck and Tender Wheels.

RAILROAD, ROLLING MILL and Machinery Castings.

and Street Railroad Wheels and Turnouts.

ALSO

Chilled-Faced Railroad Frogs.

Office: 30 Carter Street,

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Cleveland, Ohio. 32

OVER 5,000 IN USE.

The Dunning Boiler,

Patent Wrought Iron or Steel, with Self-feeding Coal Magazine, is the oldest and best for **Low Pressure Steam Heating, and insures a warm house Day and Night.**

MADE AS FOLLOWS:—As a Magazine Boiler, which requires attention but once in twenty-four hours; as a Surface Burner, to burn hard or soft coal, wood or coke; as a Hot Water Boiler, for greenhouses and hot water heating; as a Portable Boiler, to be set without brick-work. Also in two sections to pass through any door where a larger one cannot be used. Made in 13 patterns, 51 sizes. Send for Illustrated Catalogue, with full description and price list.

Keeps Steam Up Constantly. Agents Wanted.

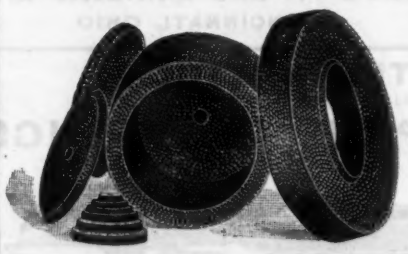
N. B.—Correspondence solicited from architects and persons building.

MANUFACTURED AT THE

New York Central Iron Works,

80 Exchange Street, Geneva, N. Y.

23-3m



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EMERY WHEEL MACHINERY

—AND—

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All goods manufactured by us are guaranteed to give satisfaction. Give them a trial on their merits. Write for circular.

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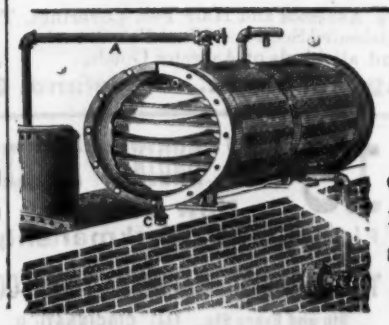
SPRINGFIELD, MASS.



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Feed Water Heater

AND

Lime Extractor.

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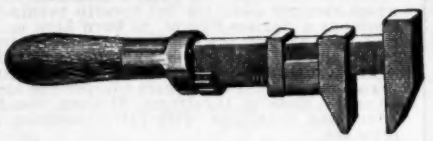

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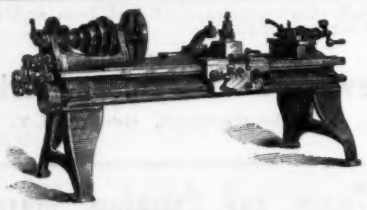

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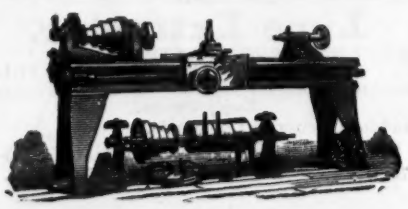

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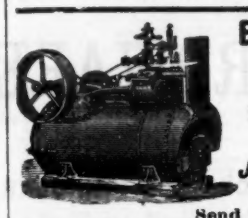

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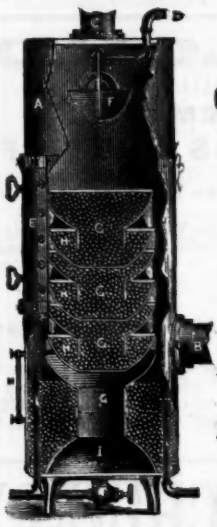

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